

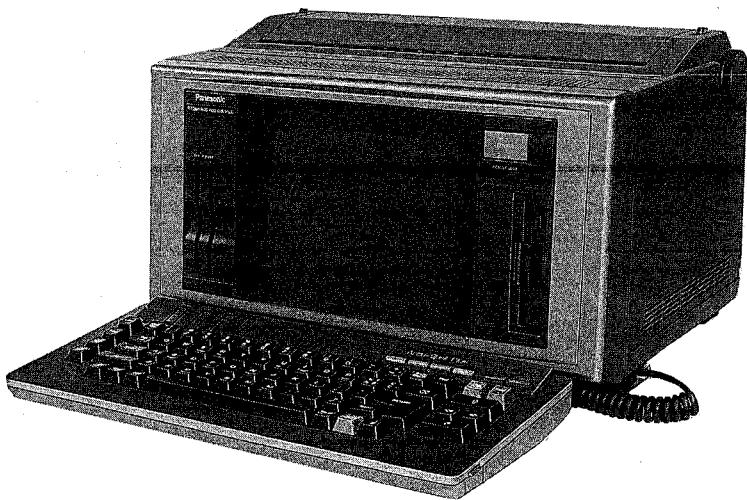
Service Manual

Personal Word Processor
KX-W1500

Specifications

Print Unit

Print Speed:	12 CPS
Print Element:	Cassette Type Daisy Wheel (Mono Plastic)
Typing Pitch:	96 Characters
Line Spacing:	10, 12, 15 CPI
Paper Width:	1, 1½, 2 Lines
Writing Line:	12" (304mm)
Paper Capacity:	10" (254mm)
Ribbon Cassette:	Original+1
Correction Tape:	Correctable, Fabric (Option)
Keyboard:	Lift-Off, Cover-Up (Option)
	45 Alpha/Numeric keys



Memory

Correction Memory:	1 Line
Text Memory:	56 KB (56,000 Characters)
Line Formats:	3 Formats
Battery Backup:	5 Years (Approx.)

Spell Verify

Basic Dictionary:	63,000 words
User' Dictionary:	120 words (8 char./word)

CRT Display

Type:	9" CRT
Number of Chrs:	80 Characters×25 Line

Floppy Disk

Disk Drive:	3.5" Micro Floppy Disk Drive (1 Drive)
Capacity:	353 KB/Disk

Power Requirements

Voltage:	120V±10%
Frequency:	60Hz
Power Consumption:	50W (AC Use)

Operating Condition

Temperature:	5°C (41°F) to 35°C (95°F)
Humidity:	20%~80%RH
Dimensions:	Height 10¾" (258mm) × Width 17¾" (451mm) × Depth 13⅓" (334mm)
Weight:	Approx. 9.8Kg (21⅓ lbs)

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Panasonic

Safety Precautions

Caution

No modification of any circuit should be attempted. Service should only be performed after you are thoroughly familiar with all of the following safety checks and service guide lines.

Safety Check

Care should be taken while servicing this display unit because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

Fire and Shock Hazard

1. When servicing, pay attention to the original lead routing, especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. All protective devices must be reinstalled per original design.
3. Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points.
Be certain to remove all foreign material.

Implosion Protection

All Panasonic picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only a Panasonic replacement picture tube.

X-Radiation

Warning: The only potential source of X-Radiation is the picture tube.

However when the high voltage circuitry is operating properly there is no possibility of an X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level.

Note: It is important to use an accurate periodically calibrated high voltage meter.

1. To measure the high voltage, connect a high voltage meter (electrostatic type) to the unit (\ominus to chassis ground and \oplus to CRT anode).
2. Turn the brightness control fully to the left (minimum brightness).
3. Measure the high voltage. The high voltage meter reading should indicate $12.7KV \pm 0.5KV$.
4. If the meter indication is out of tolerance, immediate service is required to prevent the possibility of premature component failure.
5. To prevent the possibility of X-Radiation, it is essential to use the specified picture tube. Any attempt to substitute a tube of a different manufacturer or color can result in a serious X-Radiation hazard and component failure.

Important Safety Notice

There are special components used in the Panasonic Word Processor unit which are important for safety. These parts are shaded on the schematic diagram and marked \triangle on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts only to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design without written permission from Panasonic Company or this will void the original parts guarantee.

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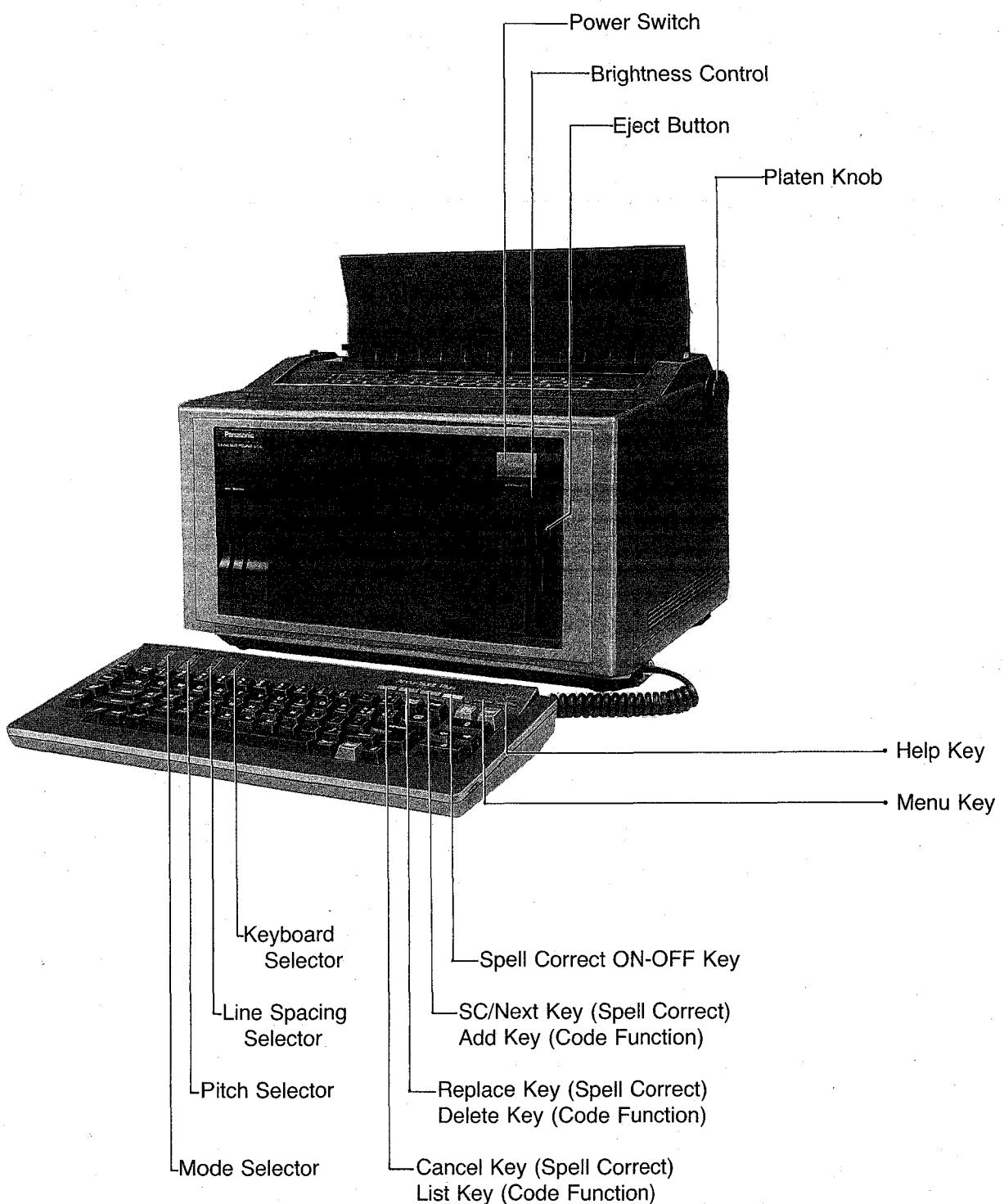
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1. General Information

1.1 Function Key Location



1.2 LIST OF CODE KEY FUNCTIONS

CODE + A.....sets/releases auto carriage return mode.
CODE + B.....sets/releases BOLD print.
CODE + C.....centers information.
CODE + D.....sets page length.
CODE + E.....embeds the screen symbols.
CODE + F.....finds mistake (in edit-mode).
CODE + G.....sets/releases the insert/over typing mode.
CODE + H.....half spacing.
CODE + I.....sets/releases Paragraph Indent.
CODE + J.....micro-pitch spacing.
CODE + K.....stores line spacing to text.
CODE + L.....changes margin format.
CODE + M.....checks remaining memory quantity.
CODE + N.....jumps to desired page.
CODE + O.....recalls Margin Format O.
CODE + P.....Stop Code.
CODE + Q.....Moves, copies and deletes information block in a text.
CODE + R.....prints information with the last character on each line aligned at the right margin.
CODE + S.....searches words in a phrase or a text.
CODE + T.....text append.
CODE + U.....sets/releases underlining.
CODE + V.....reference code for mail merge.
CODE + W.....sets page break.
CODE + X.....replaces words in a phrase or a text.
CODE + Y.....recalls Margin Format Y.
CODE + Z.....recalls Margin Format Z.
CODE + TAB.....aligns decimal points at the preset tab stops.
CODE + TAB CLR.....clears all tabs and margins.
CODE + LOCK.....presets the unit for typing capital letters, lower case numbers, punctuation marks and symbols.
CODE + SPACE BAR.....sets Permanent Space.
CODE + -(hyphen).....sets Permanent Hyphen.
CODE + 1-20 +RETURN.....recalls phrases.
CODE +makes correction manually in the typewriter mode.
CODE + BACKSPACE.....fast scroll backward word by word.
CODE + FWD.....fast scroll forward word by word.
CODE + RETURN.....searches the return mark while executing the word search command or the word replace command.
CODE + /.....Mail Merge recorder header.
CODE +Impression control.
CODE + RELOC.....express return.
CODE + ↓.....next search/replace word (in edit mode)
CODE + ↑.....Previous search/replace word (in edit mode)
CODE + NEXT PAGE.....scrolls to the previous page.
CODE + SC/NEXT.....adds the word to the user's dictionary.
CODE + REPLACE.....deletes the word from the user's dictionary.
CODE + CANCEL.....lists the words in the user's dictionary.
CODE + ↑.....scrolls to the previous screen.
CODE + ↓.....scrolls to the next screen.
CODE + ⇠.....advances the cursor to the beginning of the line.
CODE + ⇢.....advances the cursor to the end of the line.
CODE +sets/resets the white screen.

2. Removal and Replacement Procedures

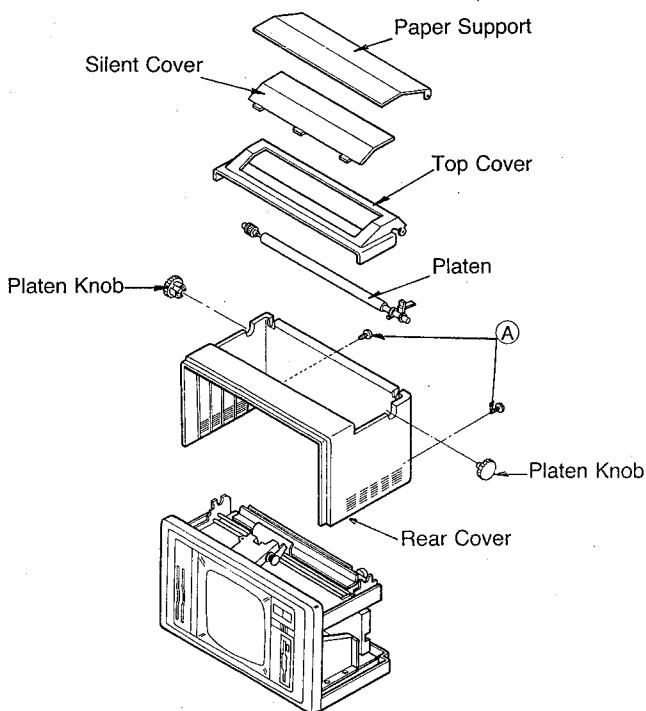
Important Caution:

For reasons of safety and to avoid possible damage to electronic components, the AC cord must be removed before disassembly.

Whenever servicing or replacing the CRT display tube, it is important that the anode high voltage be completely discharged, as high voltage (12.7KV) may remain on the anode for an extended time after power off.

Refer to "Safety Precautions" on pages 1 and 14.

Remove the keyboard unit before proceeding with the following:

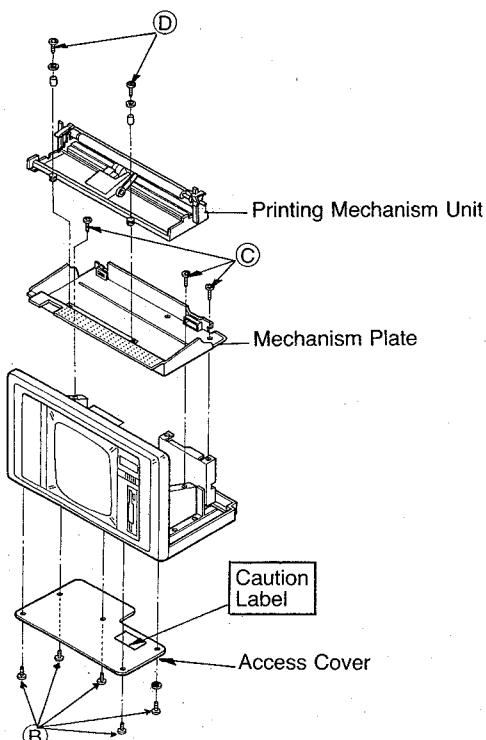


Note: To comply with safety requirements please follow the caution label on the inside of the Access Cover.

SERVICE CAUTION
PLEASE USE SCREW WITH
WASHER IN THIS LOCATION

2.1 Rear Cover

1. Remove both platen knobs.
2. Remove the top cover with reducing the clamp part from the projection. And release the platen by rotating the platen latches. (3.2.5)
3. Remove 2 screws **A** from the rear.
4. Carefully raise the rear cover by holding the back side and remove it.
5. Replacement is done in the reverse order.



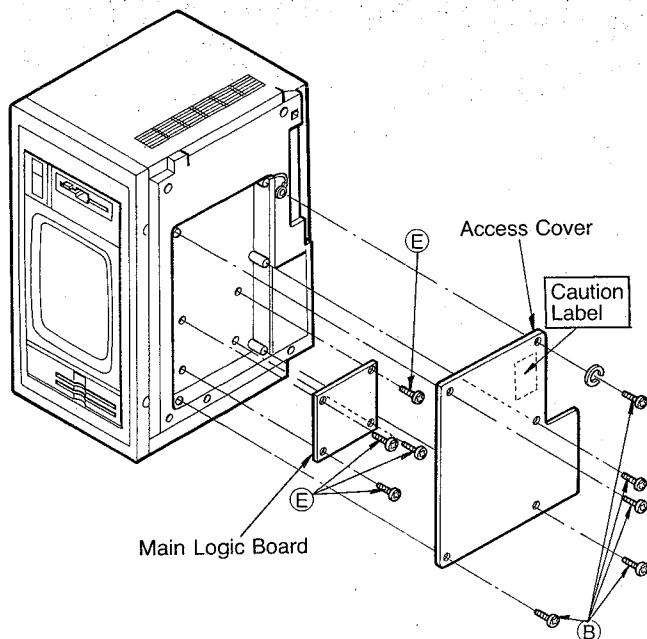
2.2 Mechanism Unit

1. Remove the rear cover (2.1) and 5 screws **B** from the access cover.
2. Unplug the following from the main logic board; the carrier flat cable CN4, the spacing motor connector CN5 and the paper feed motor connector CN2 and lid open switch connector (CN8).
3. Remove 3 screws **C** from the mechanism plate. And remove 2 screws **D** from the printing mechanism to separate from mechanism plate.
4. Release the hooks by sliding the unit a little to front and lift off it.

For disassembly the printing mechanism refer to the section 3.1.

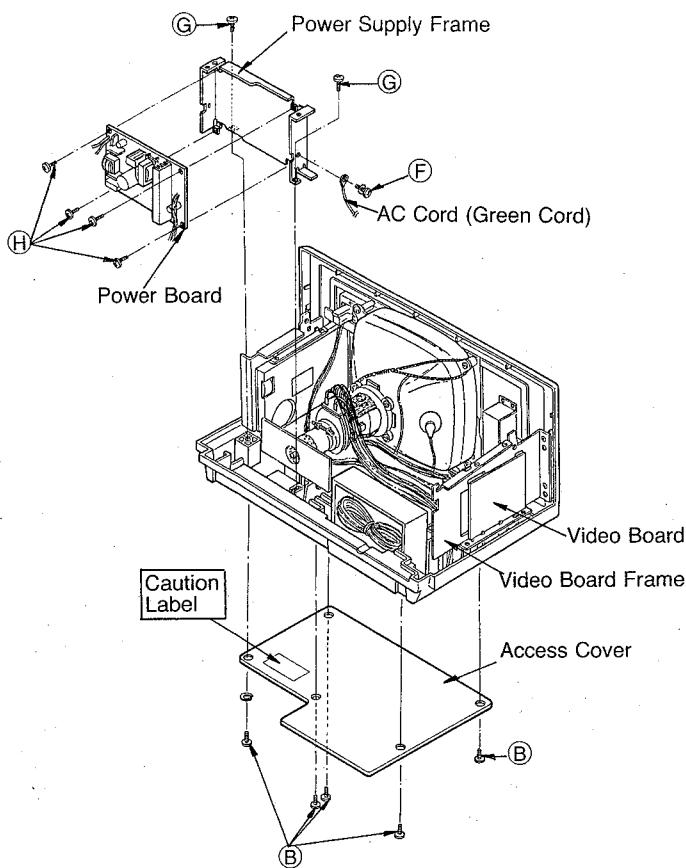
5. Replacement is done in the reverse order.

2.3 Main Logic Board

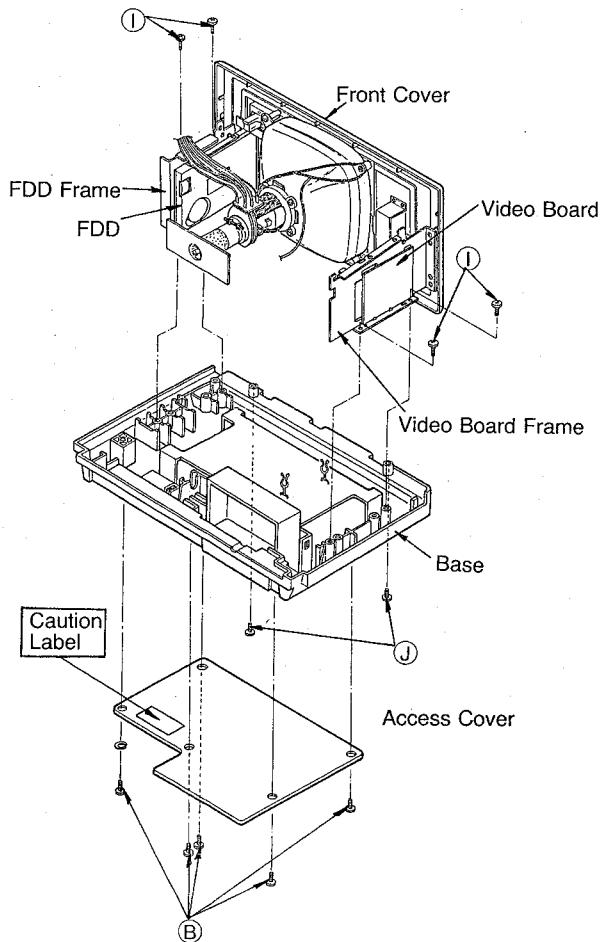


1. Carefully turn the unit side down, remove the access cover by removing 5 screws (B).
2. Unplug the following from the main logic board; Keyboard connector CN3, CRT display connector CN1, carrier connector CN4, spacing motor connector CN5, paper feed motor connector CN2, sensor connector CN8, and power supply connector CN7.
3. Unplug the FDD signal cable from the FDD unit.
4. Remove 4 screws (E) and lift off the main logic board.
5. Replacement is done in the reverse order.

2.4 Power Supply



1. Remove the rear cover (2.1) and the mechanism unit (2.2).
2. Carefully turn the unit side down and remove the access cover by removing 5 screws (B). Unplug the power supply connector CN7 from the main logic board.
3. Reposition the unit, and unplug the CRT power supply connector Co-1A from the video board.
4. Unsolder the AC SW lead from the Power Board.



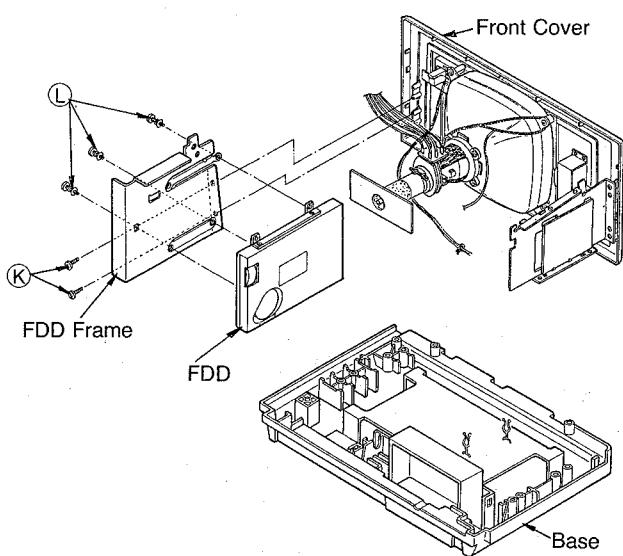
5. Remove one screw (F) which holds the ground wire of the AC cord (Green Wire) to the switching power supply frame.
6. Remove 2 screws (G) from the power supply frame.
7. Remove 4 screws (H) from the power supply.
8. Replacement is done in the reverse order.

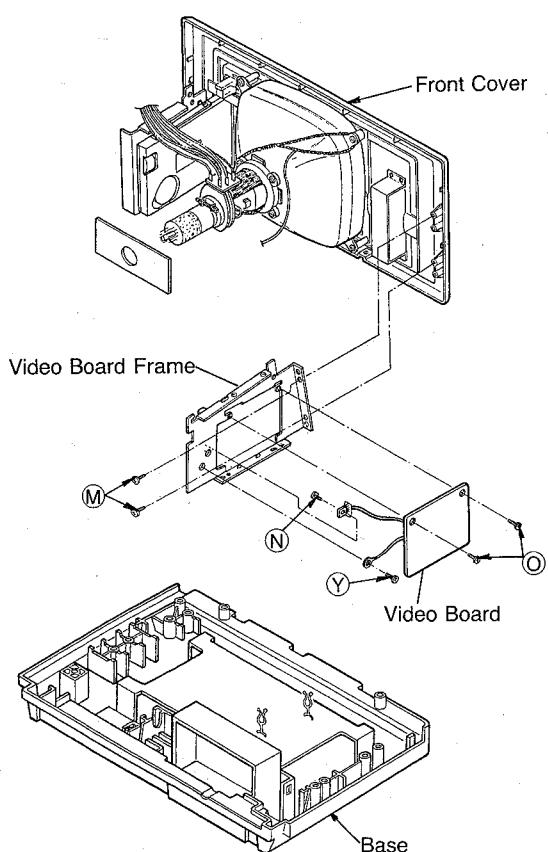
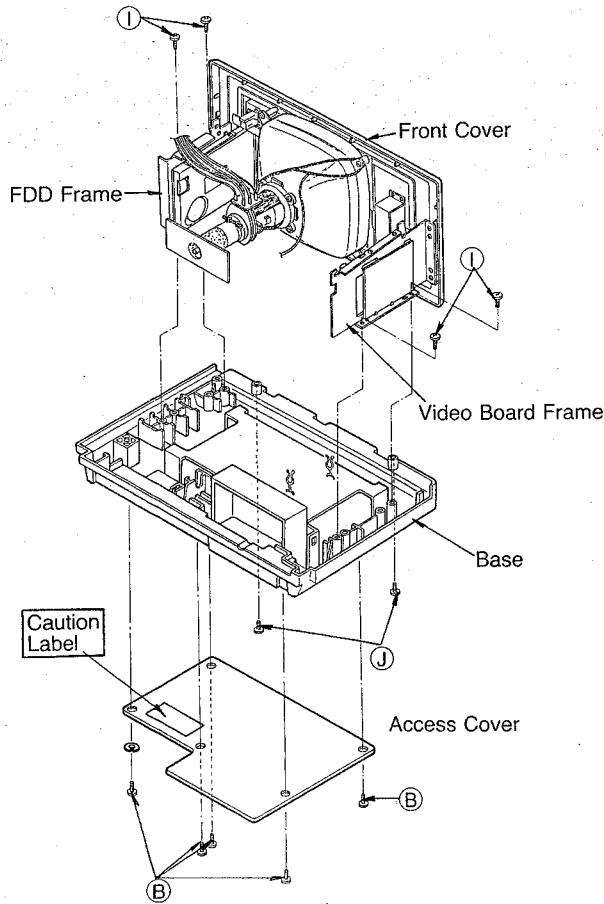
2.5 Floppy Disk Drive

Caution:

When removing the floppy disk drive, make sure that the floppy disk is not loaded.

1. Remove the rear cover (2.1) and the mechanism unit (2.2).
2. Unplug the FDD signal (grey/flat) cable from the FDD unit, and unsolder the power switch lead (Red) from the power supply.
3. Remove the power supply with the frame (2.4).
4. Carefully turn the unit face down, and remove 4 screws (I) from the FDD frame and the Video frame (2 screws each).
5. Remove 2 screws (J) from the bottom of the front cover.
6. Carefully remove the front cover from the base.
7. Remove 2 screws (K) from the front cover and lift off the FDD unit with the frame.
8. Remove 3 securing screws (L) with washer from the right side frame to release the FDD unit.
9. Replacement is done in the reverse order.





2.6 Video Board

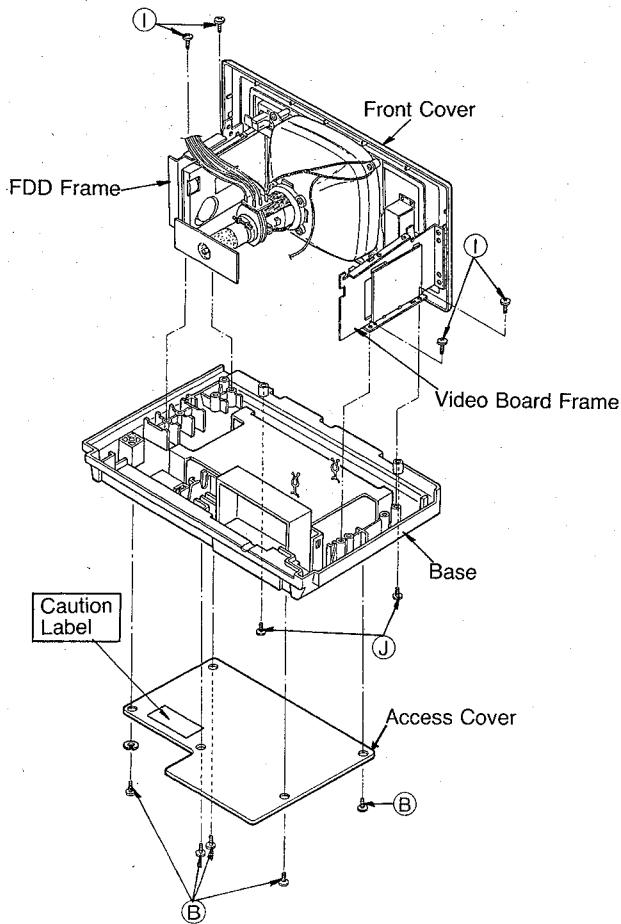
Caution:

When servicing or replacing the CRT display tube, it is important that the high voltage on the anode be completely discharged, as high voltage (13KV) may remain on the anode for an extended time after power off.

1. Remove the rear cover (2.1) and the mechanism unit (2.2).
2. Discharge the remaining static electricity by shorting between the anode and the picture tube frame ground before disassembly. Failure to completely discharge the anode may result in a shock hazard and possible component damage.
3. Unplug the anode spring and the CRT neck board from the CRT display tube. And Unplug the FDD Cable (grey/flat) from the FDD.
4. Unplug the CRT power supply connector Co-1A, the CRT connector Co-2A, and the brightness control connector Co-3A from the video board, the connector from the DY terminal and the CRT ground connector Co-2C from the CRT neck board. Then unsolder the power switch lead from the power board.
5. Carefully turn the unit face down, and remove 4 screws ① from the FDD frame and the video frame (2 screws each).
6. Remove 2 screws ② from the bottom of the front cover.
7. Carefully remove the front cover from the base.
8. Remove 2 screws ③ from the front cover and lift off the video board with frame.
9. Remove 1 screw ④ which secures the Transistor to the frame and 1 screw ⑤ which secures the GND lead.
10. Remove 2 screws ⑥ from the video board.
11. Replacement is done in the reverse order.

Note:

When installing the video board with the frame, make sure that the ground wire is secured with the screw.



2.7 CRT Display Tube

Caution:

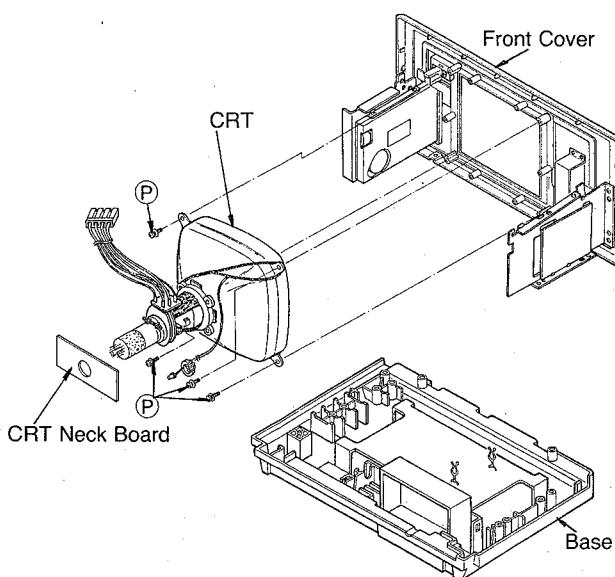
When servicing or replacing the CRT display tube, it is important that the anode high voltage be completely discharged, as high voltage (13KV) may remain on the anode for an extended time after power off.

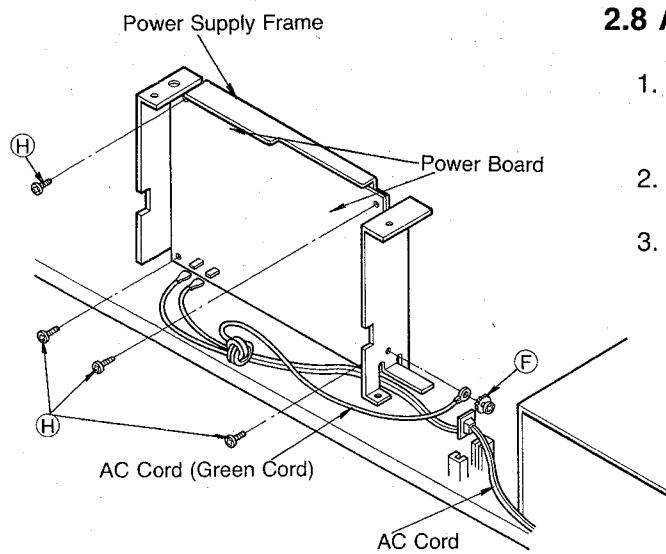
1. Remove the rear cover (2.1) and the mechanism unit (2.2).
2. Discharge the remaining static electricity by shorting between the anode and the picture tube frame ground before disassembly. Failure to completely discharge the anode may result in a shock hazard and possible component damage.
3. Unplug the connector from the DY terminal on the video board.
4. Unplug the anode spring and the CRT neck board from the CRT display tube and the CRT ground connector Co-2C from the CRT neck board. The unplug the power SW connector from the power board.
5. Carefully turn the unit face down, and remove 4 screws ① from the FDD frame and the video frame (2 screws each).
6. Remove 2 screws ② from the bottom of the front cover.
7. Carefully remove the front cover from the base.
8. Remove 4 screws ③ and washers, and remove the CRT display tube from the front cover.

Note:

Do not lift the CRT display tube by the neck.

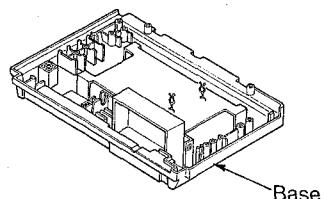
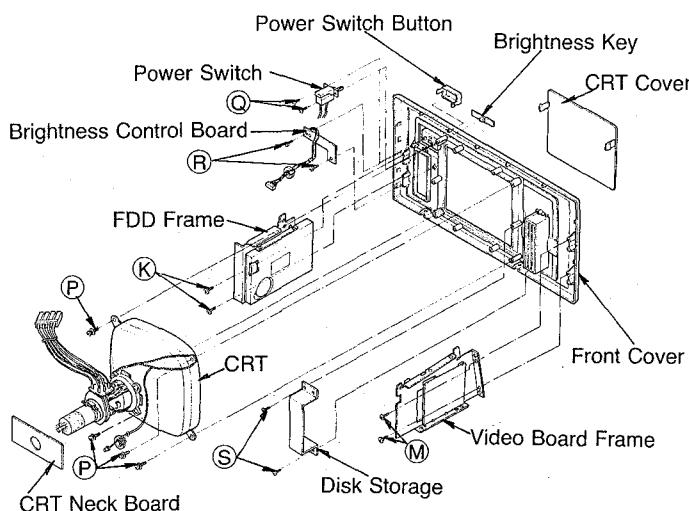
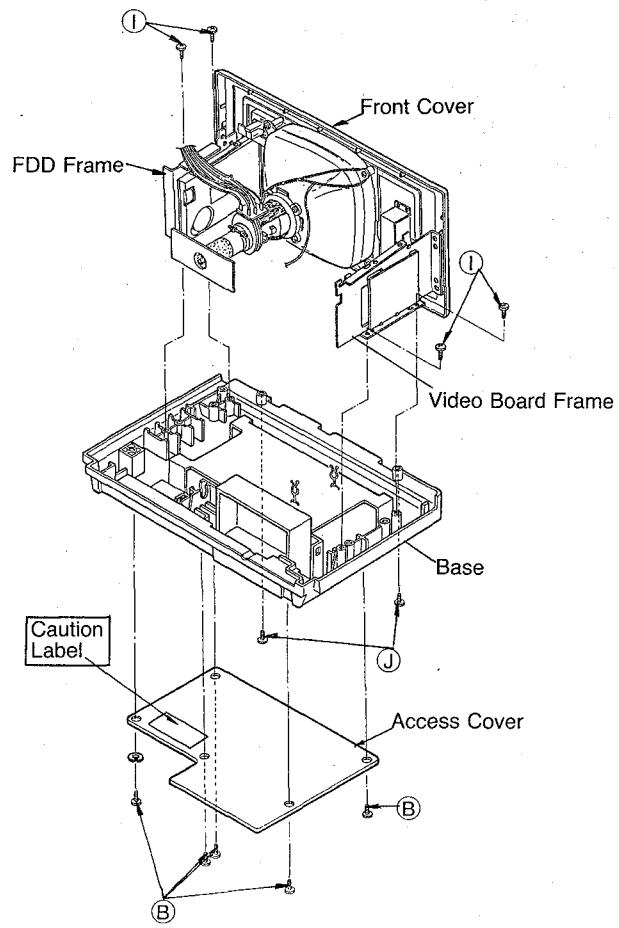
9. Replacement is done in the reverse order.





2.8 AC Cord

1. Remove the rear cover (2.1), the mechanism unit (2.2) and the switching Power Supply (2.4).
2. Unsolder the AC cord from the power board.
3. Replacement is done in the reverse order.



2.9 Front Cover

Caution:

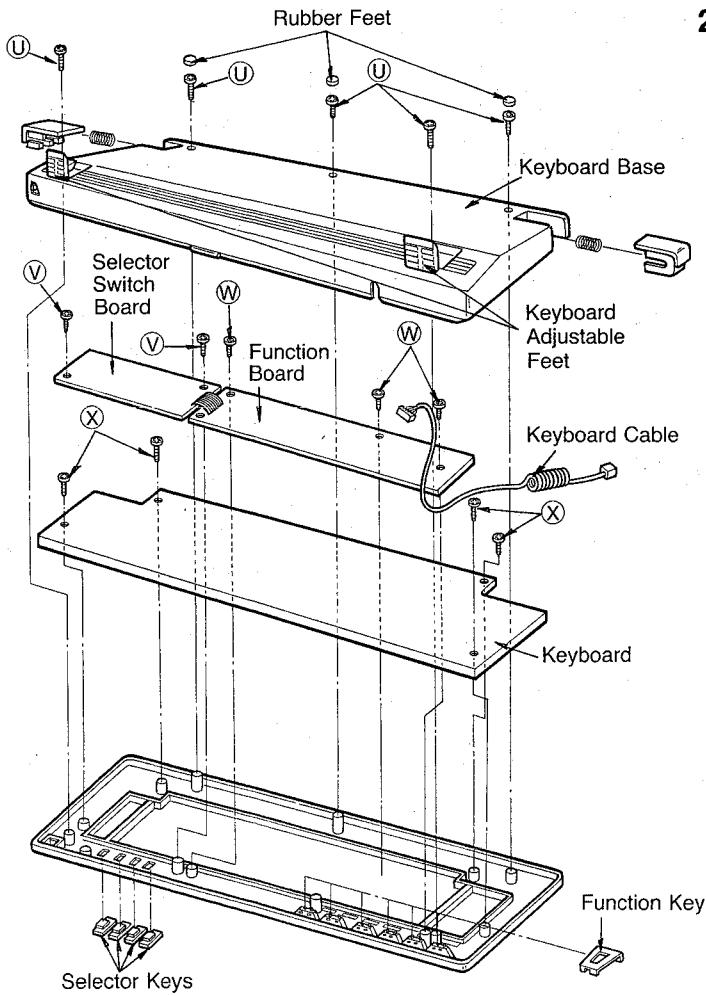
When servicing or replacing the CRT display tube, it is important that the high voltage on the anode be completely discharged, as high voltage (13KV) may remain on the anode for an extended time after power off.

1. Remove the rear cover (2.1) and the mechanism unit (2.2).
2. Discharge the remaining static electricity by shorting between the anode and the picture tube frame ground before disassembly.
3. Unplug the GND wire from the CRT neck board (Co-2C), the anode spring and the CRT neck board from the CRT display tube and the connector from the DY terminal on the video board.
4. Unsolder the power switch lead from the power supply, remove 2 screws (Q) from the power switch and release the button by pulling the power switch.
5. Unplug the brightness control connector Co-3A from the video board, and remove the brightness Key from the front cover. Remove 2 screws (R) from the brightness control board.
6. Carefully turn the unit face down, and remove 4 screws (I) from the FDD frame and the video frame (each 2 screws).
7. Remove 2 screws (J) from the bottom of the front cover located at bottom side.
8. Carefully remove the front cover from the base.
9. Remove the FDD unit with the frame (2.5).
10. Remove the video board unit with the frame (2.6).
11. Remove 2 screws (S) from the disk storage.
12. Remove 4 screws (P) from the CRT display tube.

Note:

Do not lift the CRT display tube by the neck.

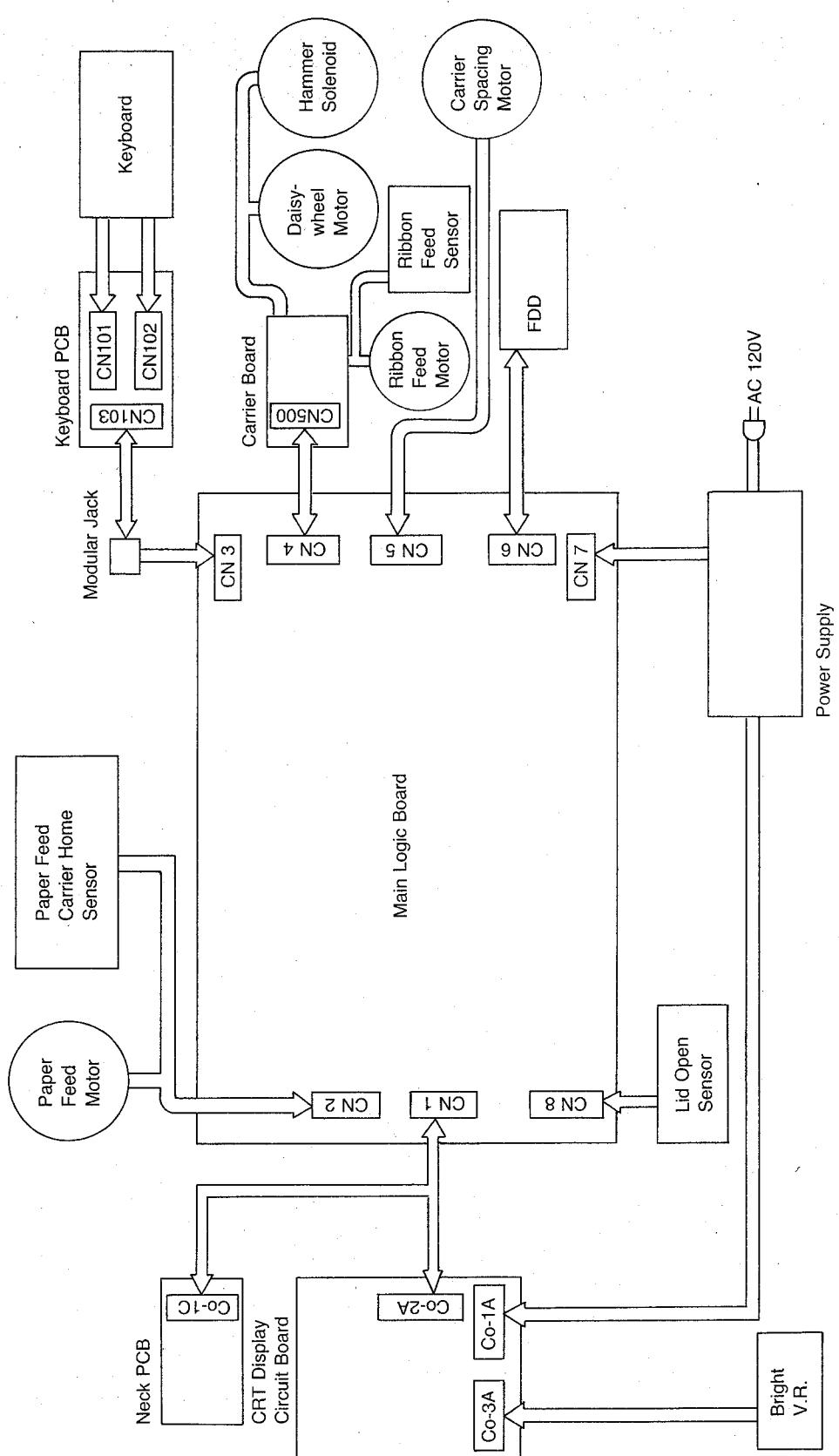
13. Replacement is done in the reverse order.



2.10 Keyboard Unit

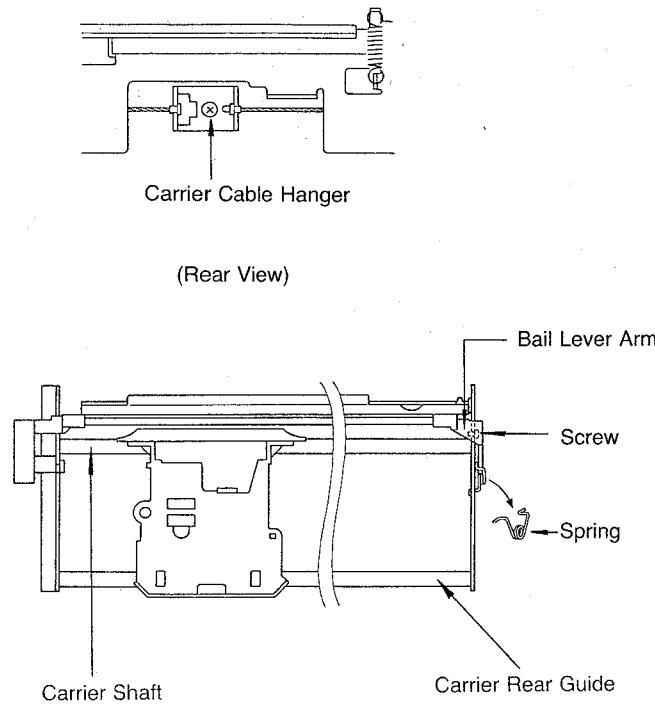
1. Unplug the curl keyboard Cable from the main unit.
2. Turn over the keyboard unit and remove the 3 rubber feet.
3. Raise the keyboard adjustable feet.
4. Remove 5 screws **U** from the keyboard base.
5. Remove 4 selector keys from the top and then remove 2 screws **V** from the selector switch board.
6. Remove 3 screws **W** from the function switch board.
7. Unplug the flat cables CN101 and CN102 from the function board and keyboard Cable connector.
8. Remove 4 screws **X** from the key board.
9. Replacement is done in the reverse order.

3 Logic Board Connection Diagram



4. Printing Mechanism

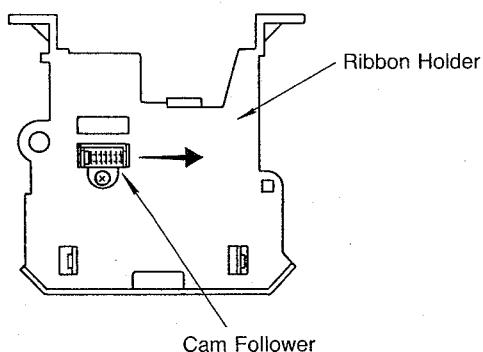
4.1 Removal and Replacement Procedures



4.1.1 Carrier

1. Unplug the flat cable from the Carrier.
2. Position the Carrier in front of the left side.
3. Remove the screw from the Carrier Cable Hanger.
4. Remove the screw from the right side frame.
5. Remove the spring from the right Bail Lever Arm.
6. Carefully remove the Bail Lever Arm away from the end of the Carrier Shaft.
7. Carefully slide the Carrier Shaft to the right.
8. Remove the Carrier.

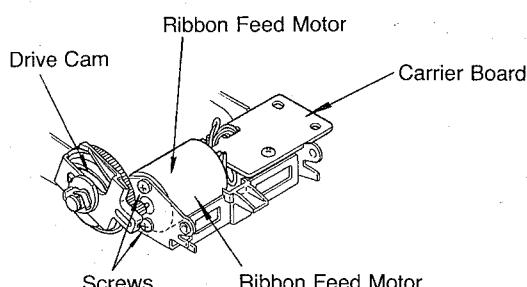
Replacement is done in the reverse order.



4.1.2 Ribbon Holder

1. Pull the Cam Follower out of the groove in the Drive Cam.
2. Slightly slide the Ribbon Holder to the right and remove it upward.

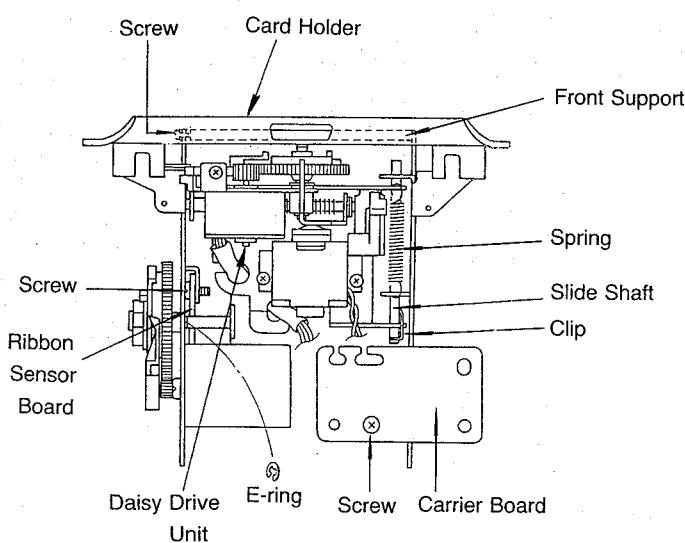
Replacement is done in the reverse order.



4.1.3 Ribbon Feed Motor

1. Unsolder the Motor leads from the Ribbon Feed Motor.
2. Remove the 2 screws from the Motor.

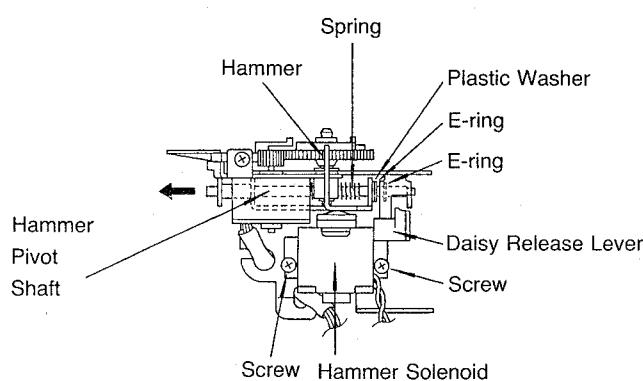
Replacement is done in the reverse order.



4.1.4 Daisy Drive Unit

1. Remove the Front Support and the Card Holder by removing the screw.
2. Remove the E-ring and the Drive Cam.
3. Remove the screw from the Ribbon Sensor Board.
4. Remove the screw from the Carrier Board.
5. Remove the spring.
6. Remove the Clip from the Slide Shaft.
7. Remove the Slide Shaft by pulling it to the front.
8. Carefully lift off the Daisy Drive Unit, Carrier Board and Ribbon Sensor Board together.

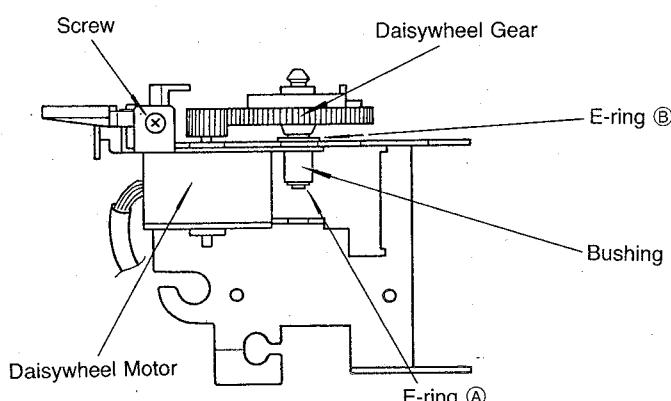
Replacement is done in the reverse order.



4.1.5 Hammer and Hammer Solenoid

1. Remove the E-rings from the Hammer Pivot Shaft.
2. Slide the Shaft to the left and remove the Hammer with the plastic washer and spring.
3. Remove the 2 screws from the Hammer Solenoid.
4. Remove the Solenoid.
5. Unsolder the Solenoid leads from the Carrier Board.

Replacement is done in the reverse order.



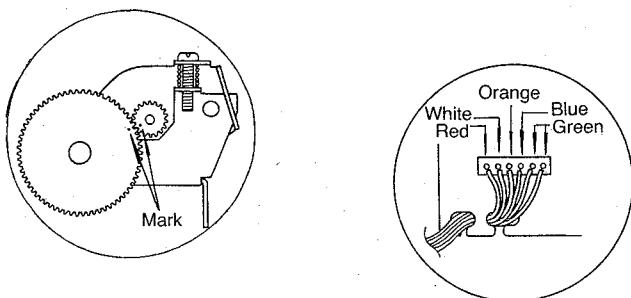
4.1.6 Daisywheel Motor

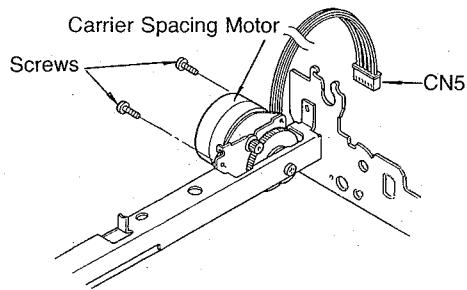
1. Remove the E-ring A from the Daisywheel Gear Shaft.
2. Pull the Daisywheel Gear forward to remove.
3. Remove the screw from the Daisywheel Motor.
4. Remove the E-ring B from the Daisywheel Shaft bushing.
5. Remove the Bushing.
6. Remove the Motor.
7. Unsolder the Motor leads from the Carrier Board.

Replacement is done in the reverse order.

During replacement check the following:

- Make sure that leads match with indicated color as shown in the figure.
- Make sure that the marks on the two Daisywheel Drive Unit Gears are aligned.





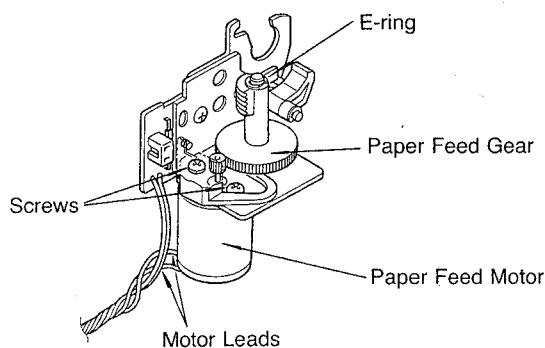
4.1.7 Carrier Spacing Motor

1. Remove the 2 screws and disengage the motor from the Cable Drum.

Replacement is done in the reverse order.

Note:

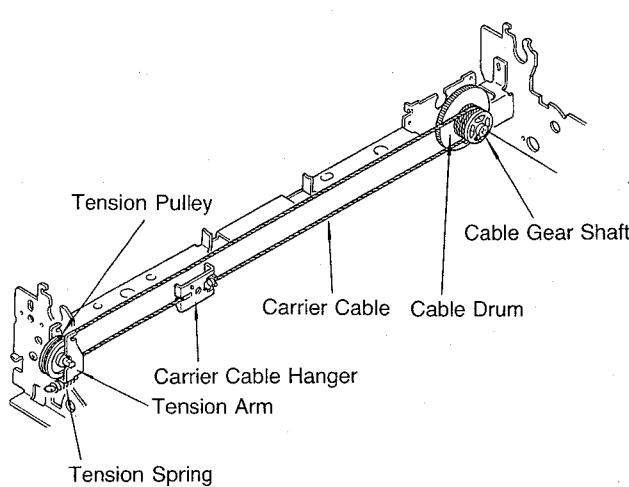
Connector CN5 must be unplugged before removing the motor.



4.1.8 Paper Feed Motor

1. Remove the E-ring from the Paper Feed Gear Shaft.
2. Remove the Paper Feed Gear.
3. Remove the 2 screws and pull the Motor downward to remove it.
4. Unsolder the Motor leads.

Replacement is done in the reverse order.



4.1.9 Carrier Cable

1. Remove the Tension spring from the Tension Arm.
2. Remove the Tension Arm from the frame.
3. Remove the Cable Gear Shaft screw and the Cable Drum.
4. Release the cable ends from the Carrier Cable Hanger.
5. Unwind the Carrier Cable.

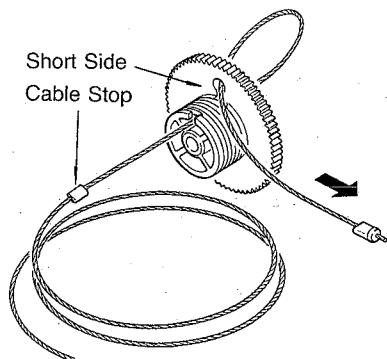
Replacement is done in the reverse order.

Follow the next section 3.1.10 for winding the cable on the Drum.

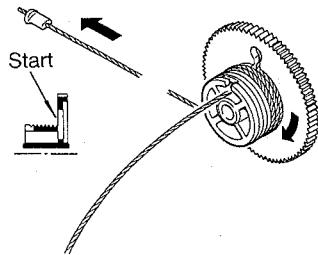
4.1.10 Carrier Cable Winding

Note:

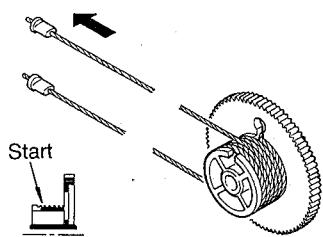
Use of Carrier Cable Jig No. PJZXXR250M will make cable installation much easier, as illustrated.



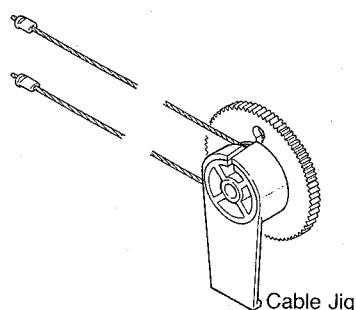
1. Insert the short end of the cable through the lower hole and back through the upper hole, pulling until the cable stops.



2. Wind the short cable end 3 full turns clockwise around the drum, starting in the first groove and hold while proceeding with Step "3".



3. Wind the long cable end 4 full turns counterclockwise around the drum, starting in the first groove from the outside, and hold.

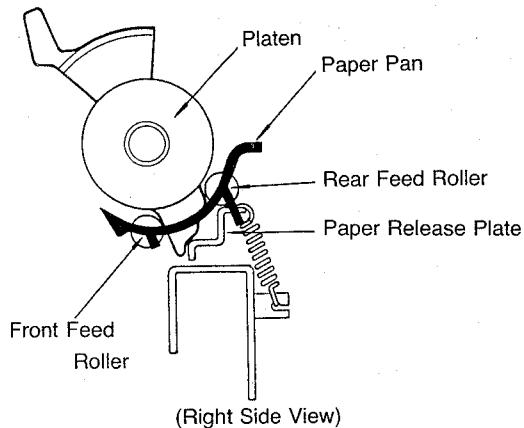


4. Slide the Carrier Cable Jig onto the drum, as illustrated, with the cable ends through the Jig opening.

Note:

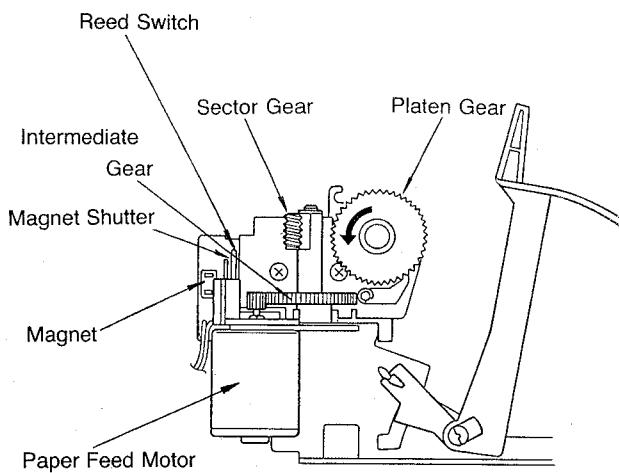
- The cable can be held in place with tape if the Jig is not available.
- Pull the Carrier Cable Jig downward to remove.

4.2 Mechanical Function and Adjustment



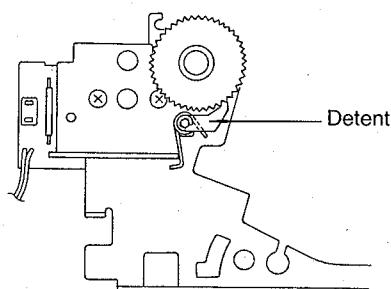
4.2.1 Paper Feed Mechanism

The paper feed mechanism, mounted on the Chassis, consists of the Platen, a spring-loaded Paper Release Plate and a floating Paper Pan which has 3 front and 3 rear Feed Rollers. As paper is inserted, it is guided between the rear Feed Rollers and the Platen, where it is gripped and fed as the Platen rotates. The paper can be advanced manually through use of either Platen Knob.



4.2.2 Paper Feed Motor

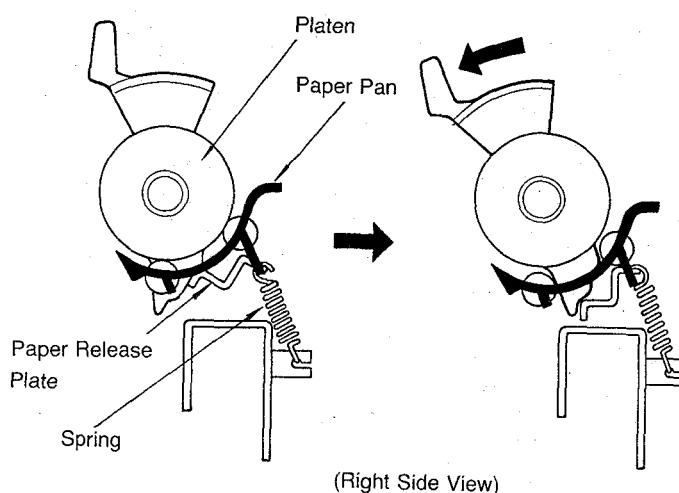
Drive for the Platen is provided by a DC motor, which rotates the Platen through a Sector Gear engaged with the Plated Gear. One complete revolution of the Intermediate Gear and Sector Gear provides 1/2 line space movement to the Platen. As the Motor is energized, it begins to rotate counterclockwise (viewed from the top) and its Gear causes the Intermediate Gear to rotate clockwise, bringing the Sector Gear into engagement with the Platen Gear and advancing the Platen. The Home Detecting Lever is activated by Cam rotation and the Magnet Shutter mounted on the top of the Home Detecting Lever turns the Reed Switch off. The Motor and Gear continue to turn through momentum until a full revolution has been completed. After rotation is completed, Platen position is maintained by a spring-loaded Detent which is engaged with the Platen Ratchet. The Paper Feed Motor is actuated whenever the Carrier return key is depressed.



4.2.3 Line Space Detent

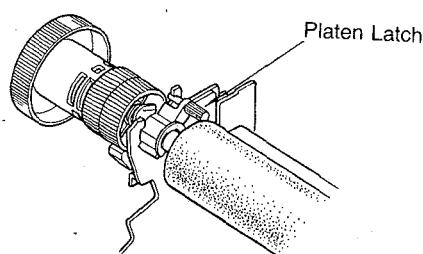
After each line space operation, the Detent is fully seated between 2 platen gear teeth by the tension of the spring attached to the Detent shaft to obtain proper line space operation.

4.2.4 Paper Release Mechanism



The Feed Roller and Paper Pan assembly is held against the Platen by the tension of 2 coil springs attached to a Paper Release Plate.

Pulling the Paper Release Lever forward causes the Paper Release Plate to move downward, increasing the tension on the coil springs and allowing the Feed Rollers to move away from the Platen.

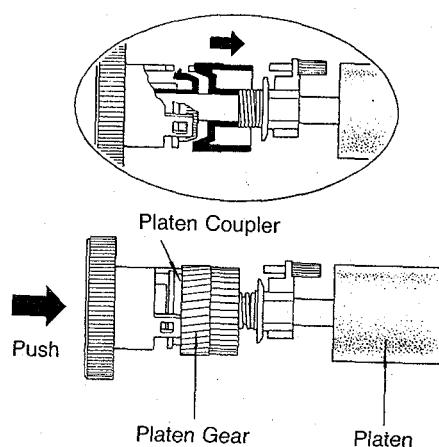


4.2.5 Platen Latches

The Platen is held securely in place by molded plastic rotary clamps installed on both ends of the Platen. The design of the Latches provides secure latching without the need of adjustment, and permits easy Platen removal and replacement.

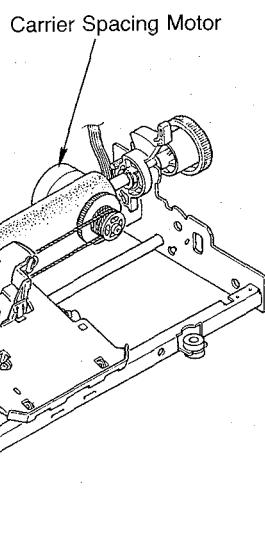
Note:

Hold the Paper Release Lever vertical when replacing the Platen.



4.2.6 Platen Variable Clutch Mechanism

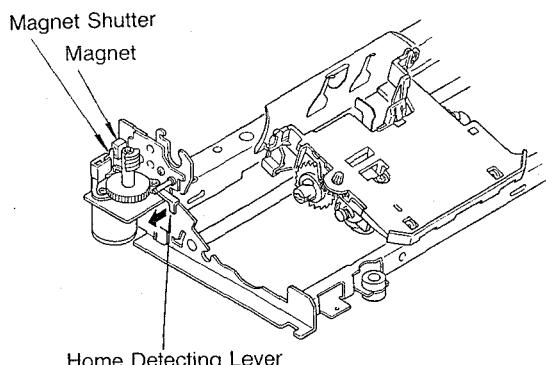
Normally rotational movement of the Platen Knob transmitted directly to the Platen, causes the engaged Platen Gear to turn, limiting Platen movement to 1/2 space (1 tooth) increments. When the left Platen Knob is pushed to the right, the spring loaded Platen Gear is moved to the right, disengaging its clutch teeth from those inside the Platen Coupler, and allowing Platen rotation without turning the Platen Gear. This permits Platen movement in very small increments.



4.2.7 Carrier Spacing

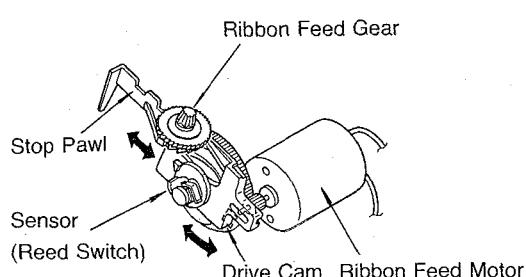
Carrier movement is provided by a stepping motor controlled by the Logic Board. Motor rotation is transmitted via a cable and pulley to the Carrier, changing the rotational motor movement to horizontal Carrier movement. The Carrier Motor is a stepping motor which operates in 7.5° increments for each pulse received. Each 7.5° step of the Motor provides carrier movement of 1/120" to the left or right, requiring the following number of steps, or pulses, per space, depending on pitch:

15 pitch = 1/15" 8 steps
 12 pitch = 1/12" 10 steps
 10 pitch = 1/10" 12 steps



4.2.8 Carrier Home Sensor

The chassis is equipped with a limit Sensor to notify the CPU when the Carrier approaches its home position, the Home Detecting Lever is activated by the Card Holder and the Magnet Shutter mounted on the top of the Home Detecting Lever turns the Reed Switch off, generating the signal and indicating the carrier home position to the CPU.

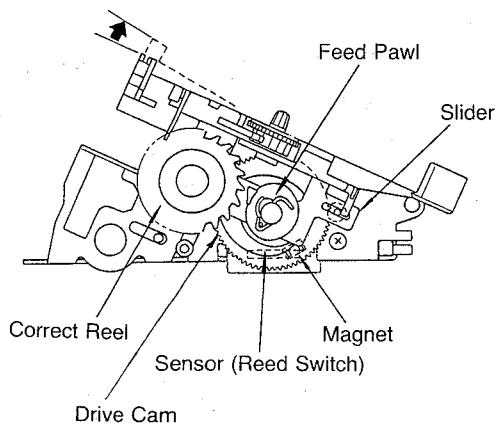


4.2.9 Ribbon Feed

Ribbon Feed Drive is provided by a bi-directional DC motor, which also provides Correction Tape Lift and Feed, depending on which direction the motor is initially activated. The home, or starting position of the motor is determined by a magnetic sensor which senses the location of the magnet affixed to the inner surface of the Drive Cam.

During a character printing operation, the Motor is energized and turns the Drive Cam in a counterclockwise direction (view from the left), until the magnet passes its sensor (Reed Switch). This one rotational movement of the Cam Feed Gear, which then advances the Ribbon Feed Gear and the Ribbon. A Stop Pawl prevents reverse movement of the Feed Gear.

4.2.10 Correction Tape Feed



During a correction operation the Motor is energized, turning the Drive Cam in a clockwise direction approximately 180° , until the magnet passes its sensor (Reed Switch), at which time it reverses direction and returns to its home position. The Drive Cam's rotational movement is changed to vertical movement by the Cam Follower in the eccentric groove on the back of the Drive Cam, lifting the Ribbon Holder to its upper position. As the Motor lifts the Holder to its upper position, the tip of the Feed Pawl which pivots on the Slider engages the Feed Gear and continues upward movement causing the Feed Gear to be advanced by one tooth. The Stop Pawl (leaf spring) prevents reverse movement of the Correct Reel.

4.2.11 Daisywheel Motor and Character Printing

a) Daisywheel Motor

The Daisywheel Stepping Motor is mounted within the Carrier frame, and is controlled by the CPU.

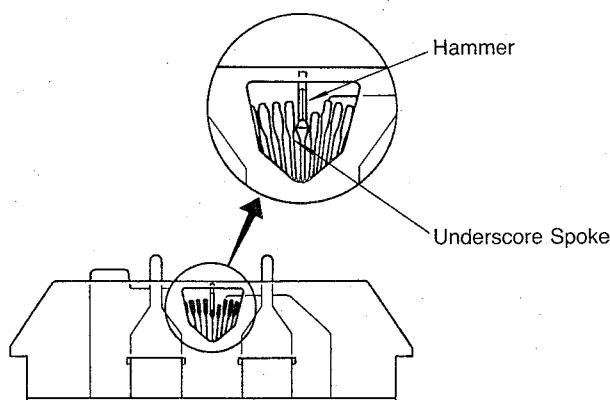
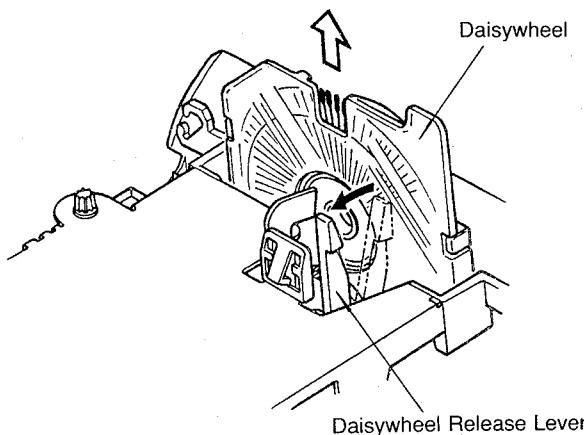
When a key is depressed, a signal is generated on the Main Logic Board, energizing the Motor and causing it to rotate to the desired point, step by step. Each step of the motor provides for 3.75° or one character spoke movement of the Daisywheel.

The home position of the Motor corresponds to the underscore character on the Daisywheel being positioned at the printing point. In this position, the Impact Hammer must be aligned with the projection at the back of the underscore spoke.

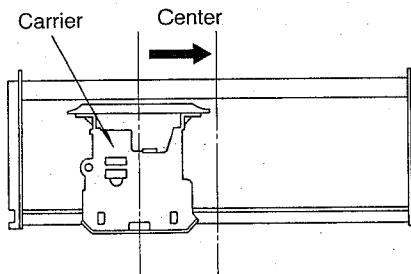
Pulling back on the Daisywheel Release Lever pushes down the Lock bar and moves the Motor away from the Platen. The Daisywheel Gear shaft and Pilot pin are disengaged from the Daisywheel, allowing the Daisywheel to be removed. Upon installation of the Daisywheel, pushing the lever forward firmly latches the Motor in the printing position. If the Pilot pin does not engage in the Pilot hole of the Daisywheel, it will re-engage automatically when the Carrier returns to the home position during initialization.

b) Character Printing

Once the Daisywheel has moved to the desired character, the Hammer Solenoid is energized by the CPU, causing the Hammer to move rapidly toward the Daisywheel, driving the character spoke into contact with the Platen. The strength of this impact is determined by the length of time the solenoid is energized, which is automatically controlled by the CPU corresponding to character surface area.

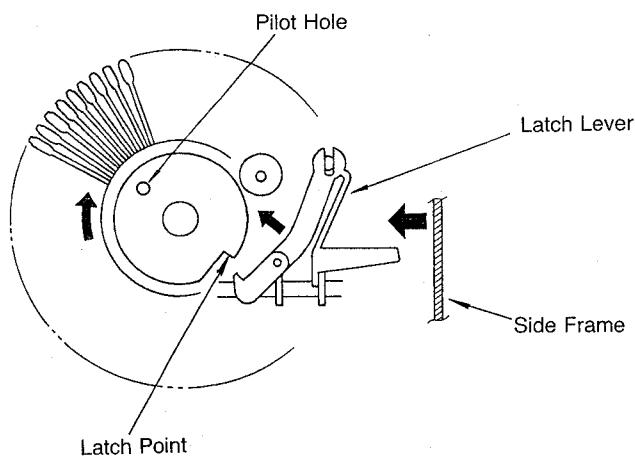


4.2.12 Easy Handling Function



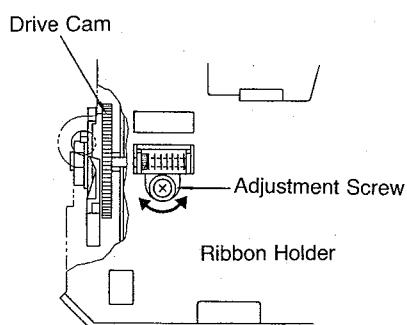
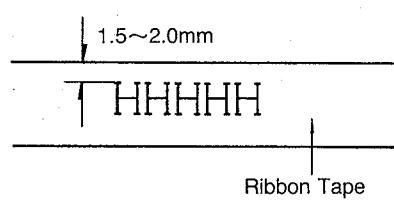
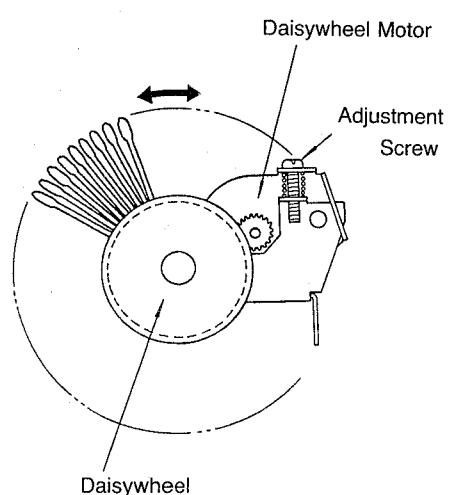
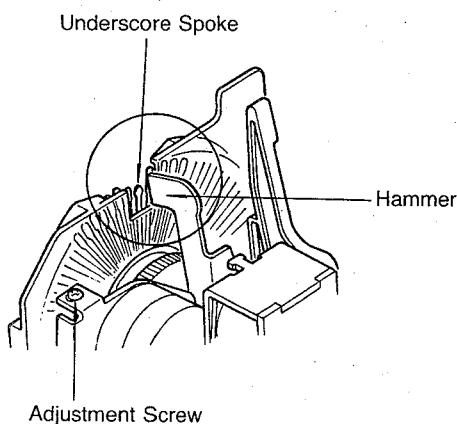
For easy handling of the Ribbon and Daisywheel replacement, the Carrier moves to the center when the Cover is opened. The Carrier moves back to its former position on the typing line, which is controlled by the CPU, when the Cover is closed.

4.2.13 Initializing



Initialization is automatically performed when the power switch is turned on. When the power switch is turned on, the Carrier moves to the far left, then the Daisywheel Home Latch Lever is pushed inward by the left side frame and the Daisy Gear turns 2 revolutions. While the Daisywheel is turning, the Home Latch lever catches the Daisywheel's latch point locating the Daisywheel home position and the Pilot Pin on the Daisy Gear engages in the Pilot hole in the Daisywheel. The Carrier then returns to the Carrier home position.

If the Cover is opened while typing, the Carrier moves to the center of the Platen. When the Cover is closed the initialization process is performed and the Carrier returns to its location before the Cover was opened.



(Top View)

4.2.14 Daisy Home Position Adjustment

Each spoke must be directly aligned with the Hammer when its character key is depressed. If necessary or when installing a new motor, adjust as follows.

Important Note:

The Daisywheel Motor must only be adjusted in the "DAISY ADJ" mode with power supplied to the motor. In the "DAISY ADJ" mode the Daisywheel motor will be energized for 2 minutes, after that the display will read "POWER OFF/ON". This message will remain until the power is turned off.

1. Install a Daisywheel and latch the motor in printing position.
2. Initialize the Daisywheel as in section 3.2.13.
3. Press the SHIFT+REPEAT keys and turn on the power at the same time. Display will read "DAISY ADJ".
4. Manually push the Hammer toward the Daisywheel, and observe the underscore spoke locator in relation to the Hammer groove. If the Hammer is not aligned with the underscore spoke, follow the next step.
5. Align the Hammer groove with underscore spoke locator by turning the Adjustment screw. After adjusting the position, observe the alignment by repeating steps 2. 3. 4.
6. Apply a locking compound to the Adjustment screw to prevent loosening.

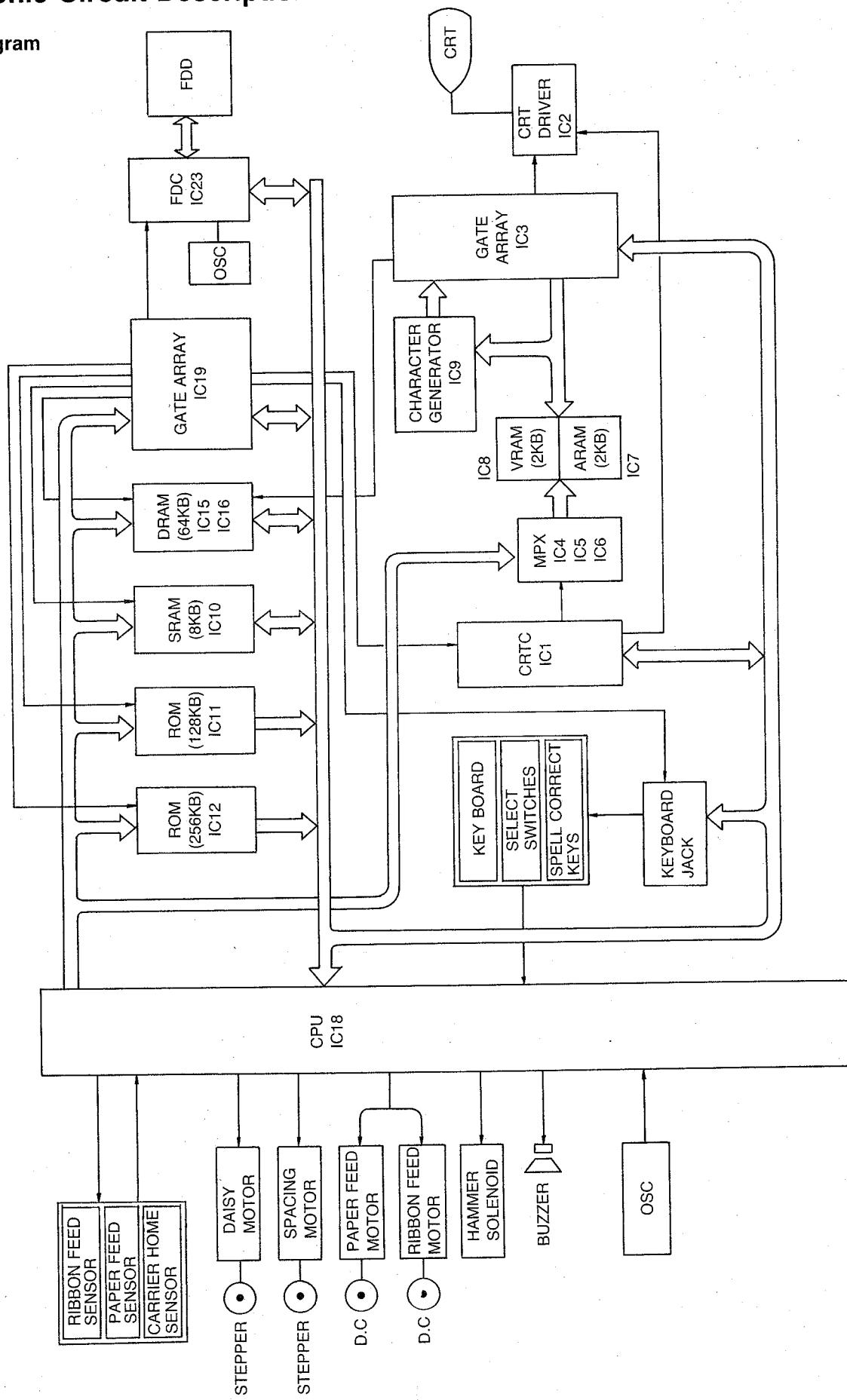
4.2.15 Ribbon Lift Adjustment

The typed character must strike near the upper edge of the Ribbon (See the illustration). Check by typing several characters and observing their position on the Ribbon.

1. The tops of capital letters should be 1.5 to 2.0mm from the upper edge of the Ribbon.
2. If the character is not in the proper position, adjust the position by turning the adjustment screw. Turning the screw clockwise will raise the position of the characters on the ribbon and counter-clockwise will lower the position.

5. Electronic Circuit Description

Block Diagram



5.1 Principle of Operation

This chapter explains the basic operation of the electronic circuitry for the KX-W1500 electronic Personal Word Processor.

The KX-W1500 electronic personal word processor is mainly composed of the Power Supply Circuit, Control Circuit, Printer Drive Circuit, Sensor Circuits, Keyboard, CRT Display and FDD (Floppy Disk Drive).

The Power Supply Circuit supplies +5V for logic circuits and FDD, +11V for Hammer Solenoid and Daisywheel and DC motor, +12V for IC and CRT heater, +18V for Spacing Motor, +30V for F.B.T.

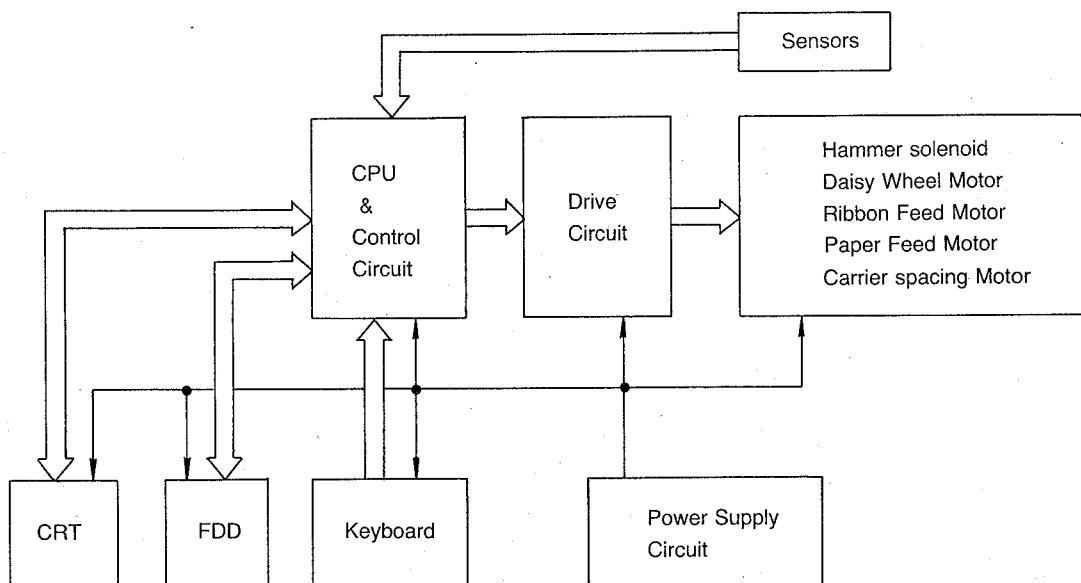
The Control Circuit is composed of ROM, RAM, CPU, three Gate Arrays, CRT Controller and FDD Controller. The Printer Drive Circuit drives the carrier spacing motor, the daisywheel motor, the paper feed motor, the ribbon feed motor and the hammer solenoid.

The Sensor circuits are used for detecting the mechanical movement and are composed of one leaf switch (Lid Open Sensor) and two magnetic sensors (Carrier Home/Paper Feed, and Ribbon Feed Sensors).

The Keyboard is composed of 45 alpha/Numeric keys, 32 Function keys and 4 slide switches.

The CRT can display 80 characters per line and 25 lines per one block.

The FDD unit is a single drive type and can store 360 K byte per diskette.



5.2 CPU and Control Circuit

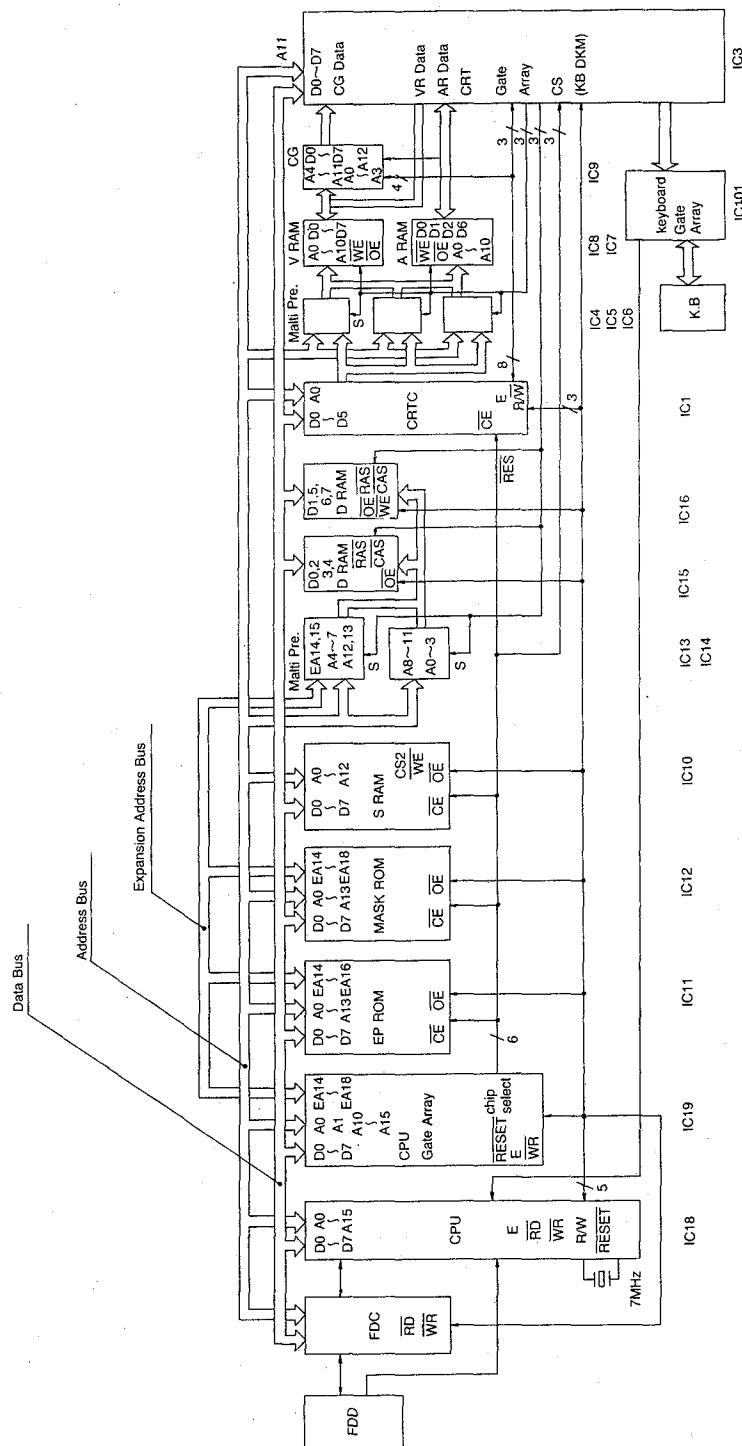
5.2.1 General Description

This block consists mainly of the CPU (IC18), ROMS (IC9, IC11, IC12), RAM (IC7, IC8, IC10, IC15, IC16), Gate Arrays (IC3, IC19), and LSI (IC1, IC23).

The CPU receives key data from the keyboard and signals from various sensors and function switches.

Then the CPU controls the CRT and FDD by control signals through the Gate Array (IC3, IC19), LSI (IC1, IC23). The CPU then controls the Daisywheel, Paper Feed, Carrier Spacing, Ribbon Feed motors and the Hammer Solenoid by control signals through Driver IC (IC20, IC21, IC22).

Block Diagram



5.2.2 CPU

The KX-W1500 is a microprocessor controlled word processor. It is built around the 8bit HD63B03X CPU "Central Processing Unit" (IC18), which has full control over all machine functions. It controls the printer mechanism, the display, and memory management. The pin names and functions are shown in the following chart.

NAME	FUNCTION		NAME	FUNCTION
Vss	GND		64	E System Clock (1.75MHz)
XTAL	RESONATOR Input	1	63	RD READ Signal
EXTAL	(7MHz)	2	62	WR WRITE Signal
MP0	CPU Mode Select	3	61	R/W READ/WRITE
MP1	CPU Mode Select	4	60	LIR Load Instruction
RES	Reset	5	59	BA Bus Available
STBY	Stand by Signal	6	58	D0
NMI	Interrupt Signal	7	57	D1
P20	Carrier	8	56	D2
P21	Spacing Motor	9	55	D3
P22	Phase Signal	10	54	D4
P23		11	53	D5
P24	Carrier Spacing Enable	12	52	D6
P25	Carrier Return Control	13	51	D7
P26	BUZZER	14	50	A0
P27	7 Hz	15	49	A1
IRQ 1	Interrupt Signal	16	48	A2
P51	Display Timing	17	47	A3
MR(P52)	MEMORY Request	18	46	A4
P53	HALT	19	45	A5
P54	Paper Feed Sensor & Carrier Sensor	20	44	A6
P55	N.C	21	43	A7
P56	Keyboard	22	42	Vss GND
P57	Data	23	41	A8
P60	Daisywheel	24	40	A9
P61	Motor	25	39	A10
P62	Phase Signal	26	38	A11
P63		27	37	A12
P64	Paper Feed Motor	28	36	A13
P65	and Ribbon Feed Motor	29	35	A14
P66	Control Signals	30	34	A15
P67	Ribbon Feed Sensor	31	33	Vcc +5V

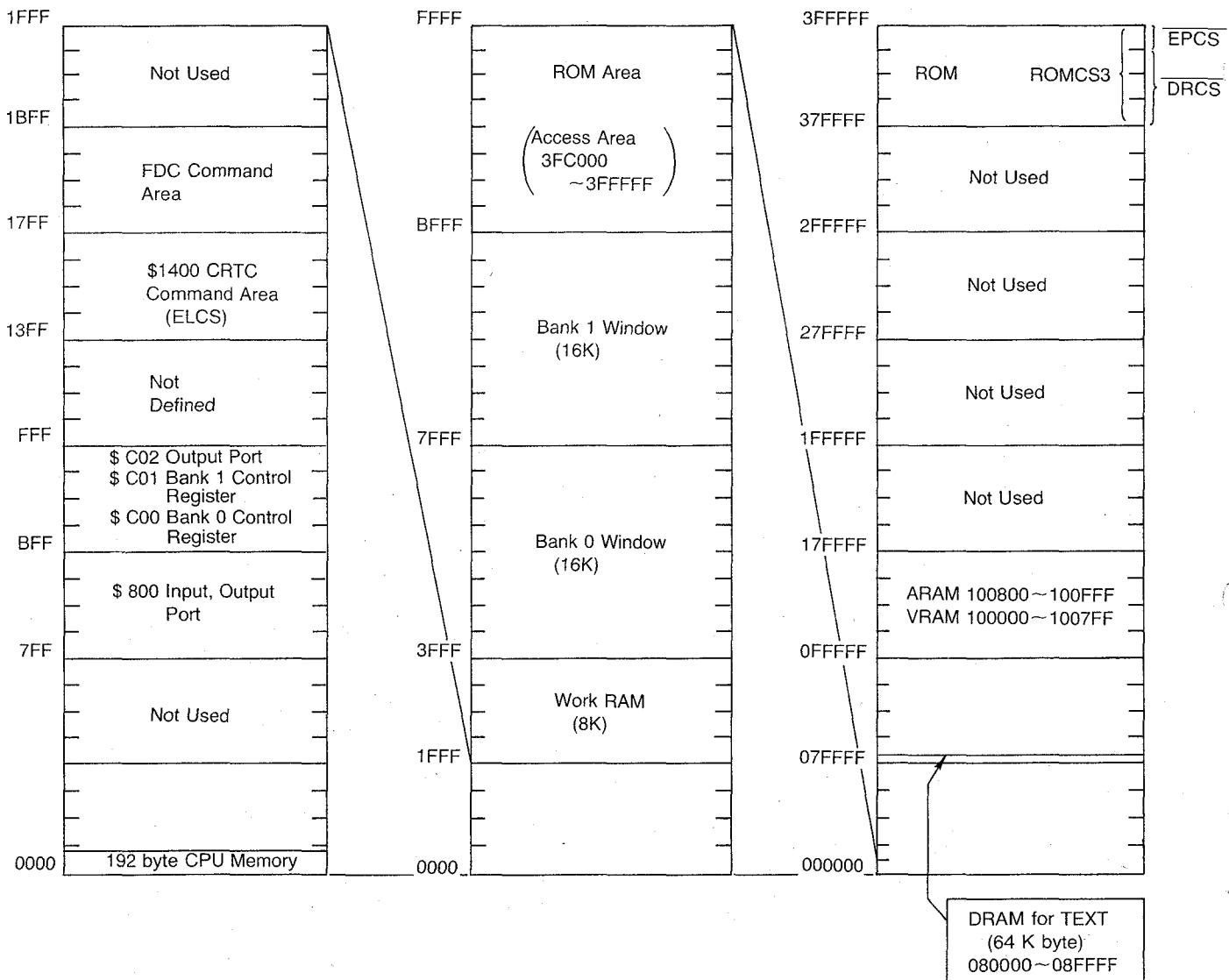
5.2.3 Memory Map

The CPU can normally access an area of 64 K byte. However, the KX-W1500 requires a 628 k byte memory area (512 K byte area for the program and dictionary, 76 K byte area for RAM, and 40K byte area for I/O).

To access a 628 K byte memory area, the CPU uses two 16 K byte Bank Windows (Bank-0 and Bank-1). The extended 628 K byte memory area is sectionalized every 16 K byte and each of these sections or blocks has its own code. When accessing one of these memory blocks, the block's code is first stored into the Bank Control Register by the CPU and then the Bank Window is accessed.

The remainder of the memory area of the CPU (32 K byte) is allocated to Internal RAM (192 byte), SRAM (8 K byte), Interface area to I/O and Operating Program (16 K byte).

KX-W1500 Memory Map

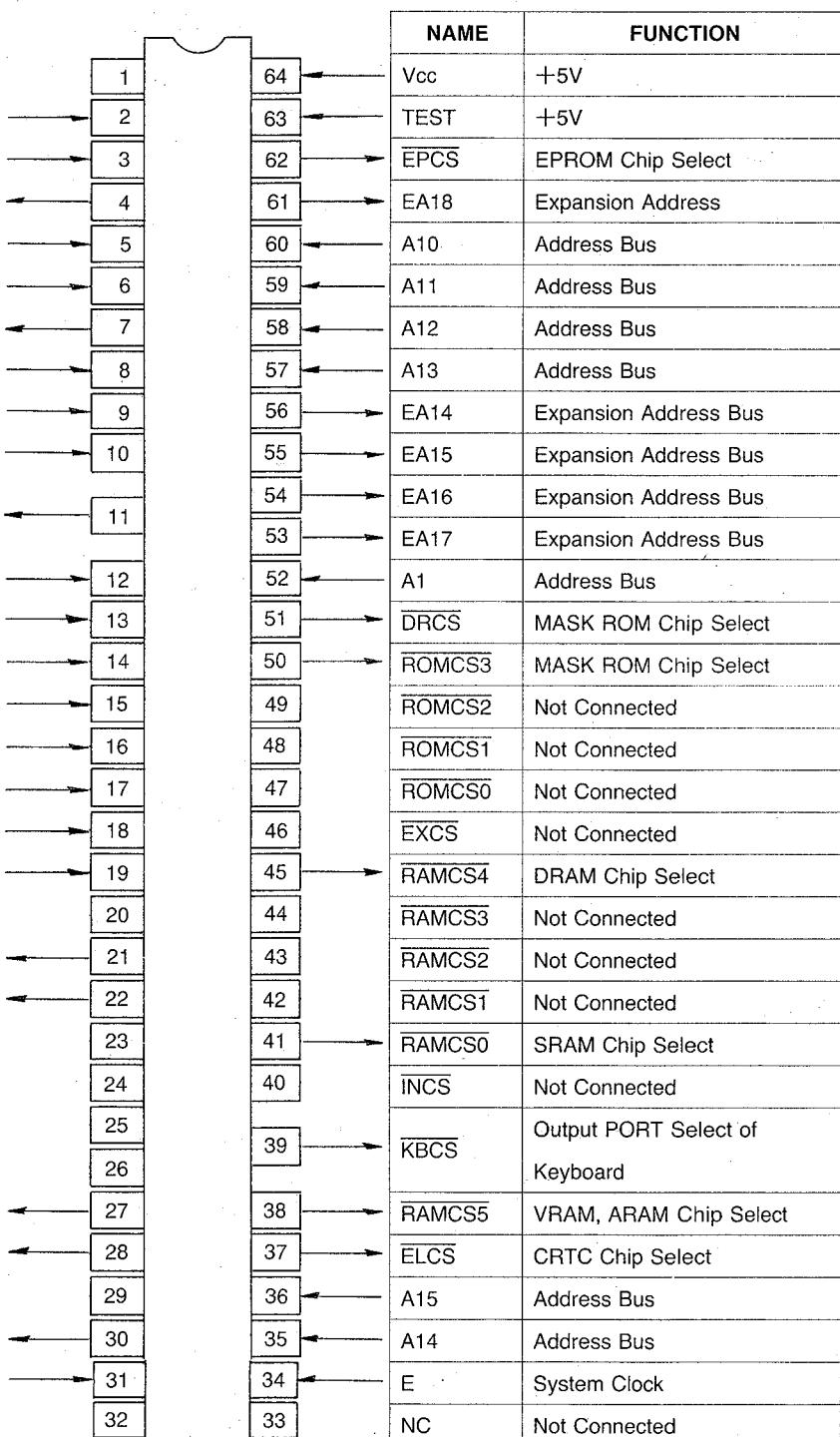


5.2.4 Gate Array Pin Function

The Gate Array Pin Functions are shown in the following chart.

(a) CPU Gate Array (IC19)

NAME	FUNCTION
N.C	Not Connected
RST	Reset
TRACK00	TRACK00 of FDD
RES	Reset
RW/SEEK	Select RW/SEEK of FDC
WR	Write
FLCS	FDC Chip Select
A0	Address Bus
D0	Data Bus
D1	Data Bus
FLT/TRK0	FLT Signal-RW/SEEK=0 TRK0 Signal-RW/SEEK=1
D2	Data Bus
D3	Data Bus
D4	Data Bus
D5	Data Bus
D6	Data Bus
D7	Data Bus
SYNC	Ground
INT	Interrupt from FDC
DREQ	Not Connected
OUT0	FDD Motor ON
OUT1	Hammer Solenoid
OUT2	Not Connected
OUT3	Not Connected
XTAL	Not Connected
MRDY	Not Connected
IRQ1	Interrupt Request 1
7 Hz	7 Hz
STBY	Not Connected
RES	RESET of System
XT	1.75 MHz Input
GND	Ground



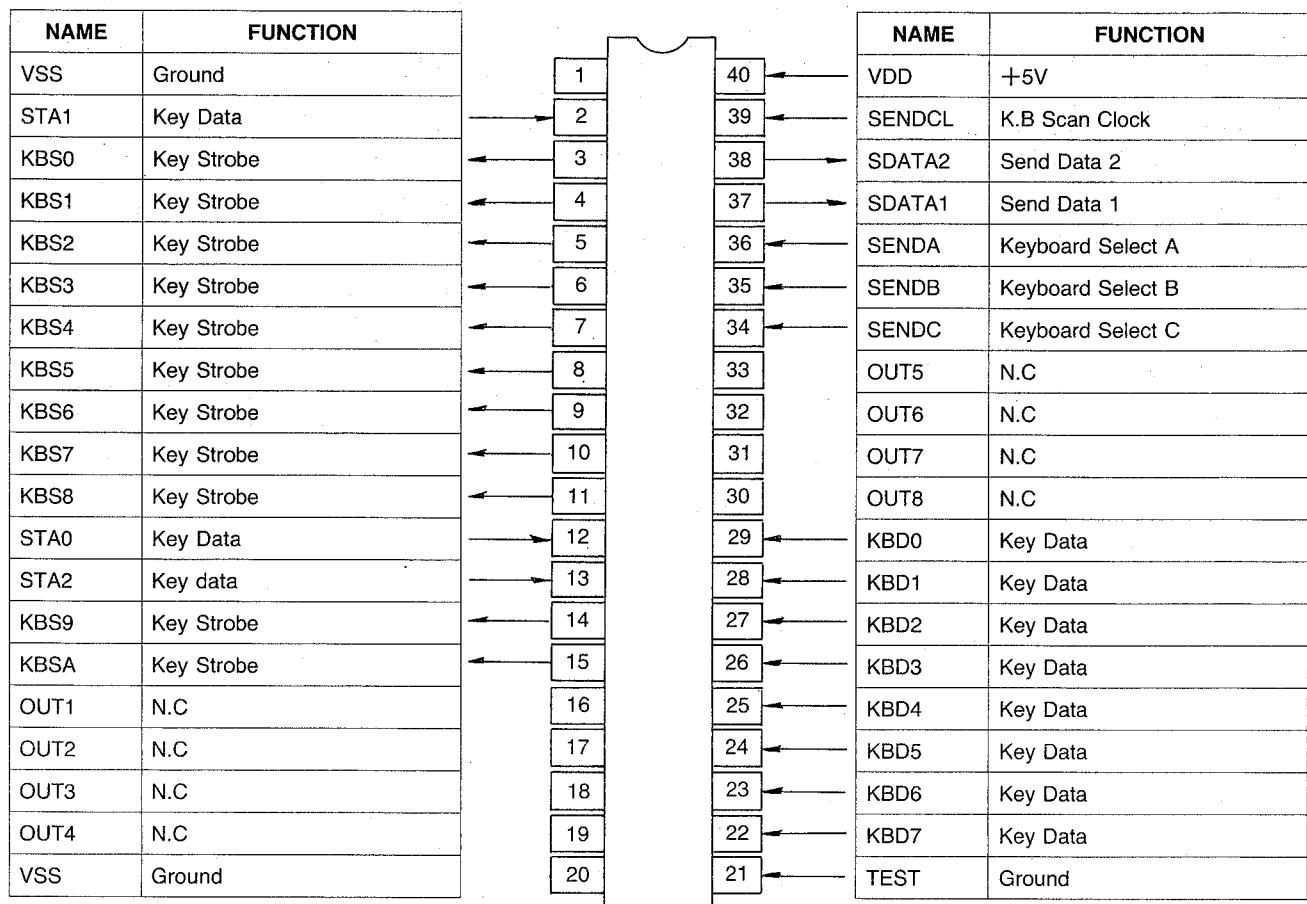
(b) CRT Gate Array (IC3)

The CRT Gate Array Pin Functions are shown in the following chart.

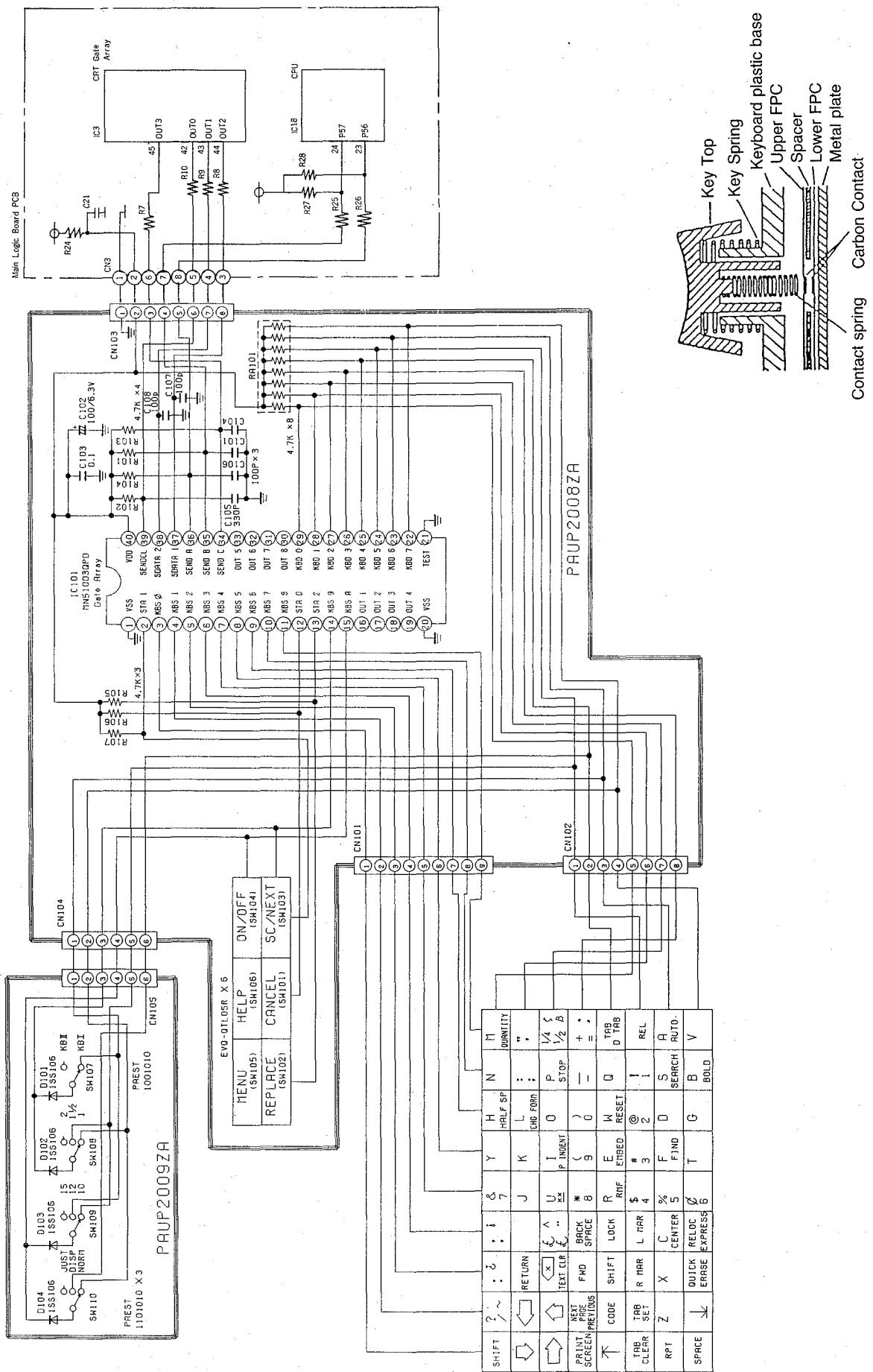
NAME	FUNCTION		NAME	FUNCTION
CAS	DRAM Column Address Select	1	Vcc	+5V
RAS	DRAM Low Address Select	2	RES	Reset
ADS	DRAM Address Select	3	RAMCS4	DRAM Chip Select
RA1	Raster Address	4	KBCS	OUT PUT Select For Keyboard
RA2	Raster address	5	RAMCS5	VRAM, ARAM Chip Select
RA3	Raster Address	6	D7	Data Bus
VRD0	VRAM Data	7	D6	Data Bus
VRD1	VRAM Data	8	D5	Data Bus
VRD2	VRAM Data	9	D4	Data Bus
VRD3	VRAM Data	10	D3	Data Bus
VRD5	ARAM Data	11	D2	Data Bus
CGD0	Char Gen Data	12	D1	Data Bus
CGD1	Char Gen Data	13	D0	Data Bus
CGD2	Char Gen Data	14	XT1	22 MHz
CGD3	Char Gen Data	15	XT2	22 MHz
GND	Ground	16	TEST	Ground
CG4	Char Gen Data	17	GND	Ground
CG5	Char Gen Data	18	IN7	Lid Open SW
CG6	Char Gen Data	19	IN6	N.C
CGD7	Char Gen Data	20	OUT3	Keyboard
VRD6	VRAM Data	21	OUT2	Keyboard
VRD7	VRAM Data	22	OUT1	Keyboard
VRD5	VRAM Data	23	OUT0	Keyboard
VRD4	VRAM Data	24	A11	Address Bus
VRAM	VRAM WRITE ENABLE	25	RD	Read
ARD4	ARAM Data	26	WR	Write
ARD6	ARAM Data	27	CLK	2.75 MHz
ARD7	ARAM Data	28	R/W	Read/Write
ARAM	ARAM WRITE ENABLE	29	E	System Clock
CUDISP	Cursor	30	VIDEO	FONT Data
DISPTMG	Display Timing	31	SELECT	VRAM, ARAM Address Select
Vcc	+5V	32	VSYN	60 Hz

(c) Keyboard Gate Array (IC101)

The Keyboard Gate Array Pin Functions are shown in the following chart.



5.3 Keyboard Matrix Circuit

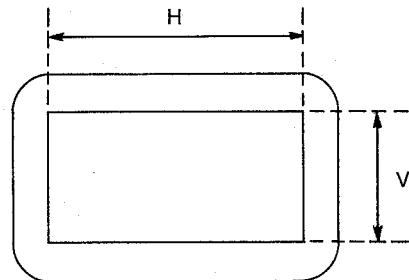


5.4. CRT Display Circuit

5.4.1 Specifications

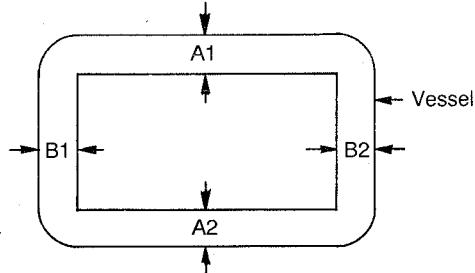
Power Input:	12V DC, 30V DC
Current Rating:	0.64Amax
Signal Input	
Video (Negative)	Low = 0V \pm 0.4V High = 4V \pm 1.5V Low = 0V \pm 0.4V High = 4V \pm 1.5V Low = 0V \pm 0.4V High = 4V \pm 1.5V
Horizontal Sync: (Positive)	High = 4V \pm 1.5V
Vertical Sync: (Negative)	High = 4V \pm 1.5V

Video Display Area	
Horizontal:	$H = 6.299" \pm 0.197"$ (160mm \pm 5mm)
Vertical:	$V = 4.724" \pm 0.197"$ (120mm \pm 5mm)

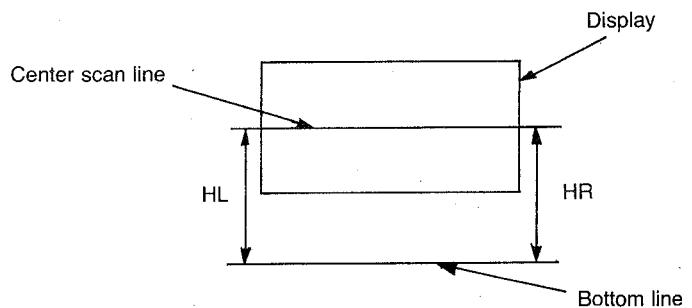


Video Display Location

Horizontal:	$ B1 - B2 \leq 0.197" (5mm)$
	$ A1 - A2 \leq 0.197" (5mm)$

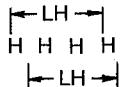


Video Display Tilt: IHL - HRI $\leq 0.079" (2.0mm)$



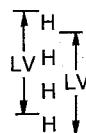
Linearity

$$\text{Horizontal: } \frac{| LH_{\text{max.}} - LH_{\text{min.}} |}{| LH_{\text{max.}} + LH_{\text{min.}} |} \times 100 = 10 (\%)$$



Vertical:

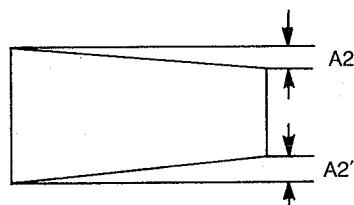
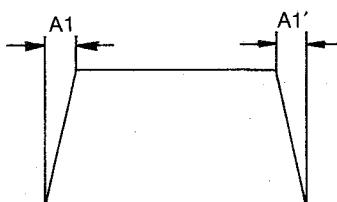
$$\frac{| LV_{\text{max.}} - LV_{\text{min.}} |}{| LV_{\text{max.}} + LV_{\text{min.}} |} \times 100 = 10 (\%)$$



Trapezoid Distortion:

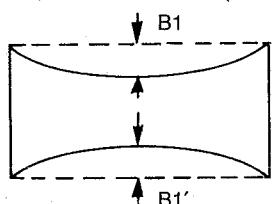
$$A1, A1' \leq 0.106" (2.7mm)$$

$$A2, A2' \leq 0.067" (1.7mm)$$

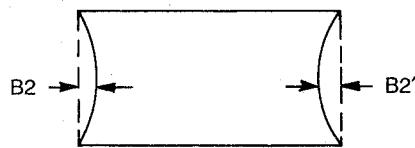


Pincushion Distortion:

$B1, B1' \leq 0.059''$ (1.5mm)

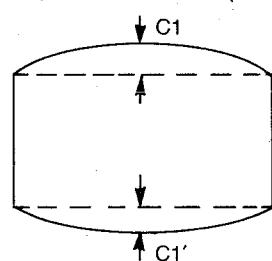


$B2, B2' \leq 0.087''$ (2.2mm)

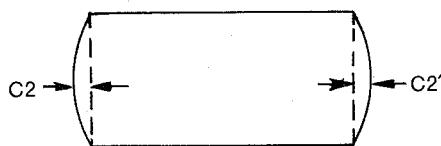


Barrel Distortion:

$C1, C1' \leq 0.059''$ (1.5mm)

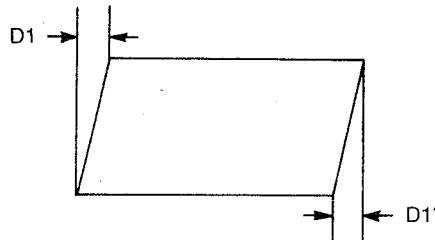


$C2, C2' \leq 0.087''$ (2.2mm)



Parallelogram Distortion:

$D1, D1' \leq 0.087''$ (2.2mm)



Operating Environment

Ambient

Temperature: Operating..... $32^{\circ}\text{F} \sim 104^{\circ}\text{F}$ ($0^{\circ}\text{C} \sim 40^{\circ}\text{C}$)
Storage..... $-4^{\circ}\text{F} \sim 122^{\circ}\text{F}$ ($-20^{\circ}\text{C} \sim 50^{\circ}\text{C}$)

Relative Humidity: 5% ~ 90%

Altitude: Operating..... 0ft ~ 10,000ft (0m ~ 3,000m)
Storage..... 0ft ~ 40,000ft (0m ~ 12,000m)

Cathode Ray Tube (CRT)

Part No.: 230BTB40HBN
90° deflection, 0.787" (20mm) ϕ neck

Phosphor: B4

Finish: Direct etching

Display Character: 80 characters X 25 lines

Block Matrix: 16 dots X 16 lines
(Font: 14 dots X 14 lines)

Resolution: 640 Typical (at 25ft-l)

5.4.2 Adjustment

Before proceeding with the following adjustment, press the Code and Menu keys to change the display to the white screen, or diagnostic procedure on page 66.

(a) Control Location

Video Board (Solder Side View)

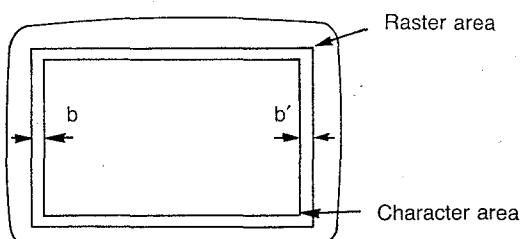
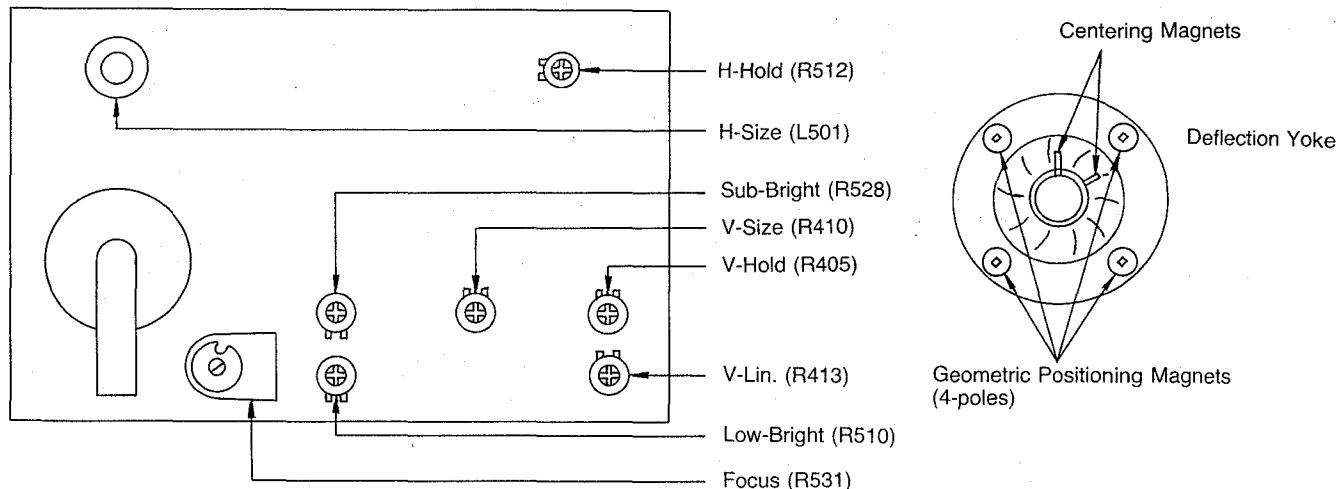


Figure 6

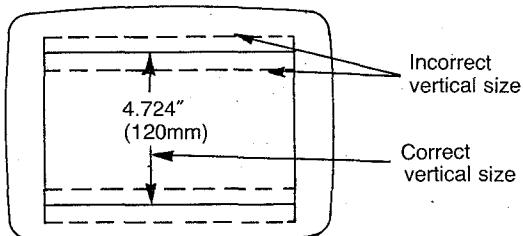


Figure 7

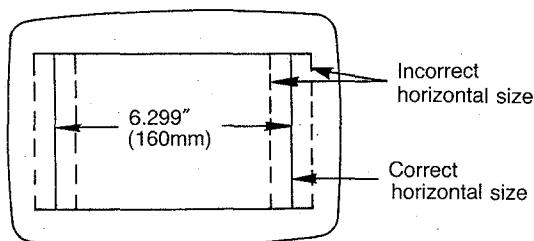


Figure 8

(b) Vertical Hold Adjustment

Adjust the vertical hold control (R405) until vertical movement stops.

(c) Horizontal Hold Adjustment

Adjust the horizontal hold control (R512) to set the character area in the horizontal center of the raster. ($b=b'$ See Fig. 6.)

(d) Vertical Size Adjustment

Adjust the vertical size control (R410) to set the vertical size of the active character area as shown in Fig. 7.

(e) Horizontal Size Adjustment

Adjust the horizontal size coil (L501) to set the proper width of the active character area as shown in Fig. 8.

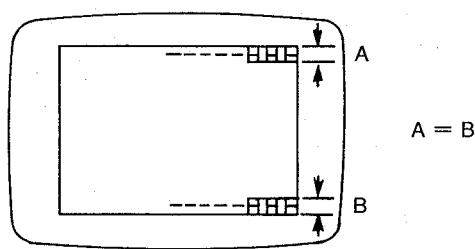


Figure 9

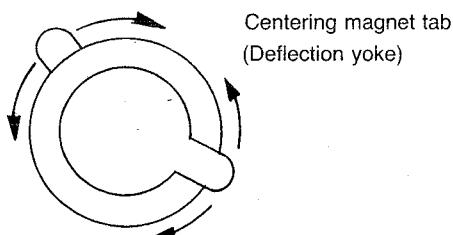
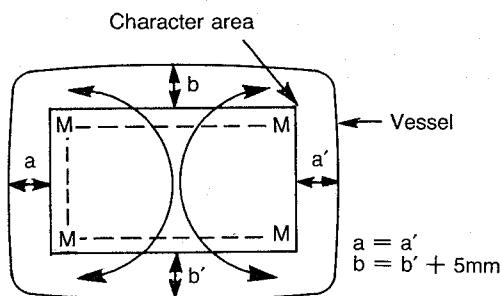
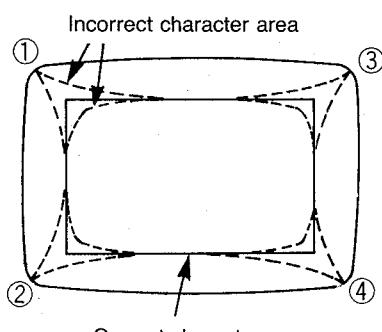
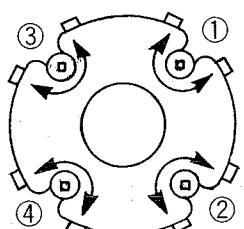


Figure 10



Correct character area



Distortion correcting magnet
(Deflection yoke)

Figure 11

(f) Vertical Linearity Adjustment

Adjust the vertical linearity control (R413) for uniform character height within the active character area as shown in Fig. 9.

(g) Centering Magnet Adjustment

Rotate the centering magnet tabs away from each other until the character area is centered on the screen as shown in Fig. 10.

Note: Be sure that DY is fully inserted to the front of the CRT's neck.

(h) Focus Control Adjustment

Adjust the focus control (R531) until optimum focus is seen on the characters displayed at the center of the display area.

(i) Geometric Distortion Adjustment

Adjust each "distortion correcting magnet" until the active character area is adjusted to the proper shape as shown in Fig. 11.

Note: Be sure that DY is fully inserted to the front of the CRT's neck.

(j) Low-Brightness Adjustment

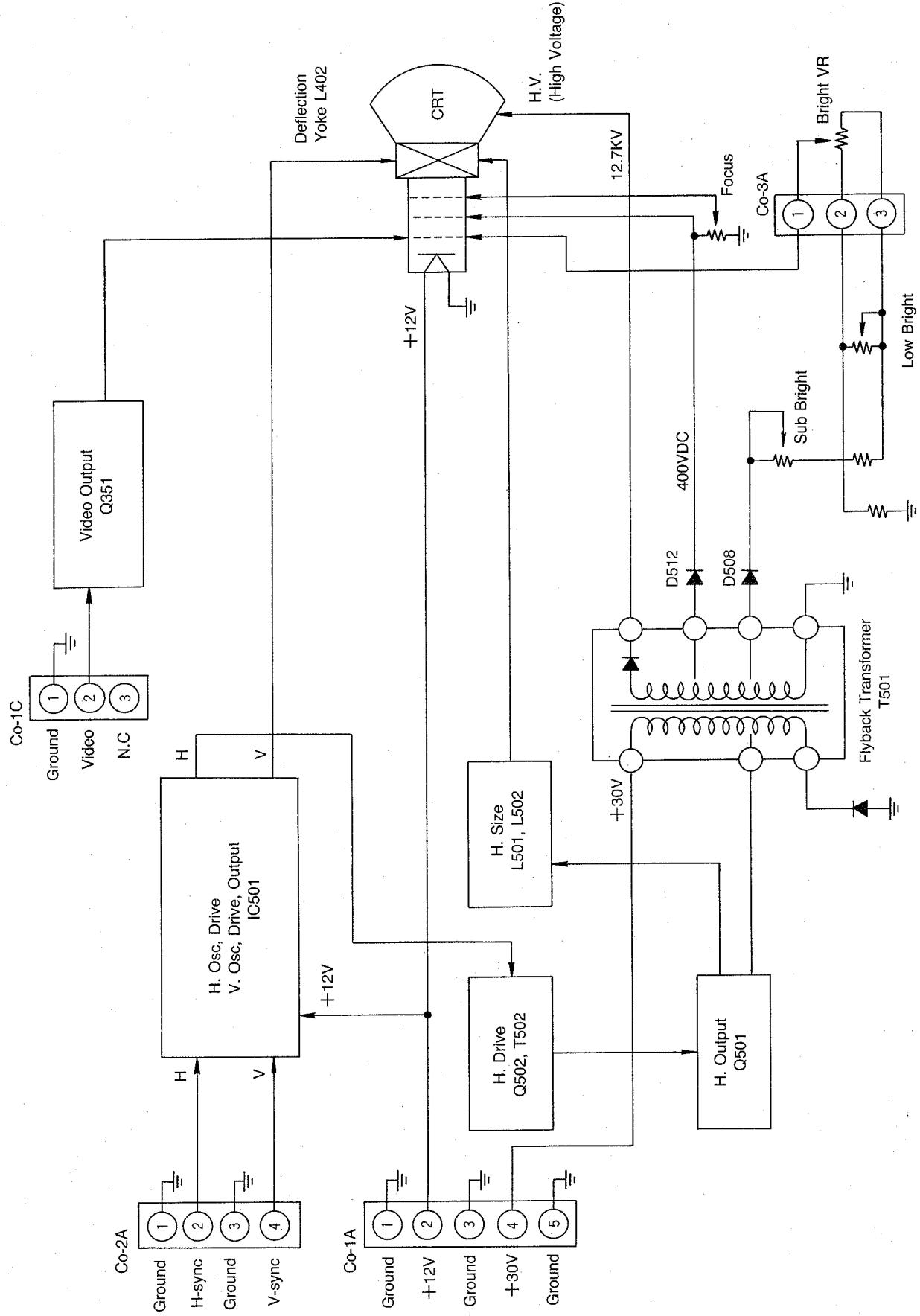
1. Slide the brightness control to left side for minimum brightness.
2. Adjust low-brightness control (R510) so that the raster is no longer visible when viewed from a distance of 30cm.

(k) Sub-Brightness Adjustment

1. Slide the brightness control to right side for maximum brightness.
2. Adjust sub-brightness control (R528) so that the back raster is not visible any more.

CAUTION: Too high the sub-brightness control (R528) setting can result in lower CRT life.

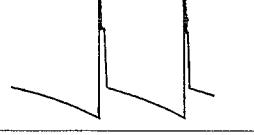
5.4.3 Block Diagram

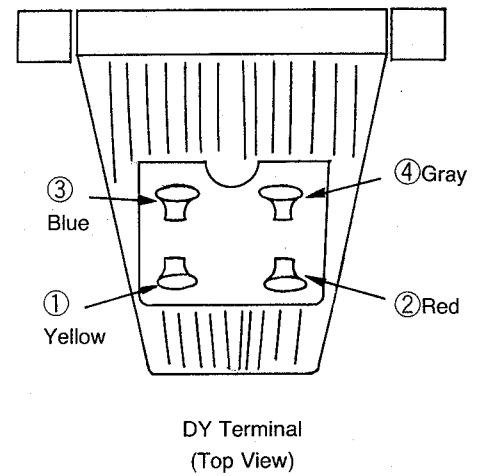


5.4.4 Waveform

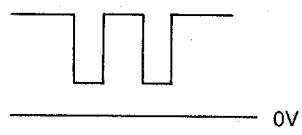
The following are Waveform on the Deflection Yoke and CRT Terminal, when the CRT Unit is working correctly. Use these Waveforms and voltages as references when troubleshooting the CRT unit.

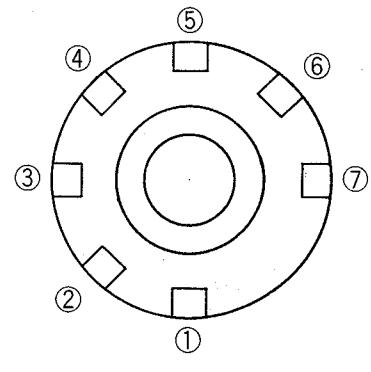
A. Deflection Yoke

Pin No.	Waveform or Voltage
1	12Vp-p [V] 
2	170Vp-p 
3	13Vp-p 
4	23Vp-p 



B. CRT Terminal

Pin No.	Waveform or Voltage
1	36V DC (G1)
2	20Vp-p (H) 
3	12V DC (Heater)
4	Ground
5	37V DC (G1)
6	400V DC (G2)
7	0V ~ 360V DC (Focus)



5.5 Floppy Disk Drive Unit

5.5.1 General Description

This micro Floppy Disk Drive is able to write to or read from a 3.5 inch Floppy Disk which conforms to the MFD standard.

It is interface compatible with the 5 1/4 inch mini FDD and can record single sided/double density.

5.5.2 Specification

1 Capacity of Memory

Memory Capacity	Unformatted	500Kbytes
	Formatted	353Kbytes
Memory Capacity	Unformatted	6250bytes
	Formatted	4608bytes

2 Recording Method

MFM

3 Data Transfer Speed

250Kbit/sec

4 Recording Density

8187BPI

5 Disk Rotation Speed

300rpm

6 Track Density

135.466TPI

7 Number of Track

80

8 Power Requirement

DC 5V 10%
Ripple voltage less than 100mV p-p

9 Power Consumption

Typ 0.37A
Max 1.1 A

5.5.3 Periodic Maintenance and Drive Information

(a) Head Cleaning

This FDD does not need Head Cleaning during normal use.

If reading or writing errors occur frequently, clean magnetic head with any available Head Cleaning Disk for approximately 30 seconds.

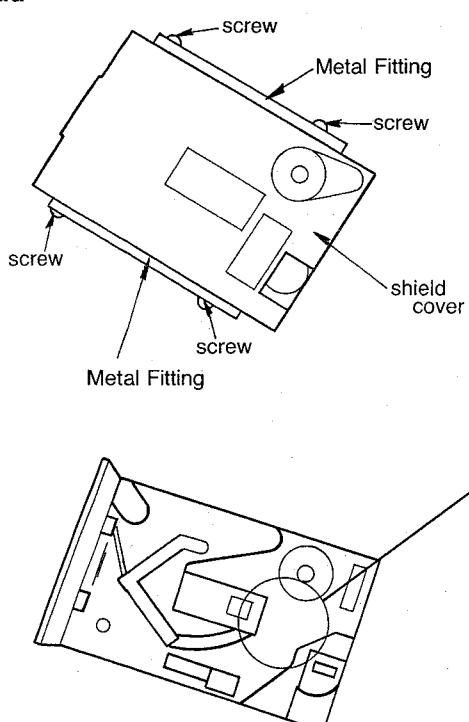
(b) Head Life

The Head Life of the FDD is about 10,000 hour.

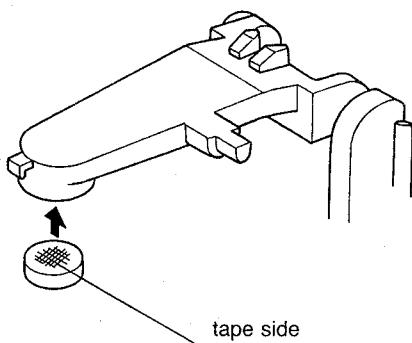
Note:

The floppy disk drive is a non-repairable unit and if defective, should be replaced as a complete sub-assembly.

(c) Head Pad



① Remove the Shield cover and Metal Fittings by removing 4 screws.



② Remove the pad which is fixed on to the tip of the arm with both sides taped.

When you install a new pad, paste it parallel with the arm's round point.

Note: Make sure that there is no adherence of dust, oils or other foreign matter on the surface of the new pad.

(d) Disk

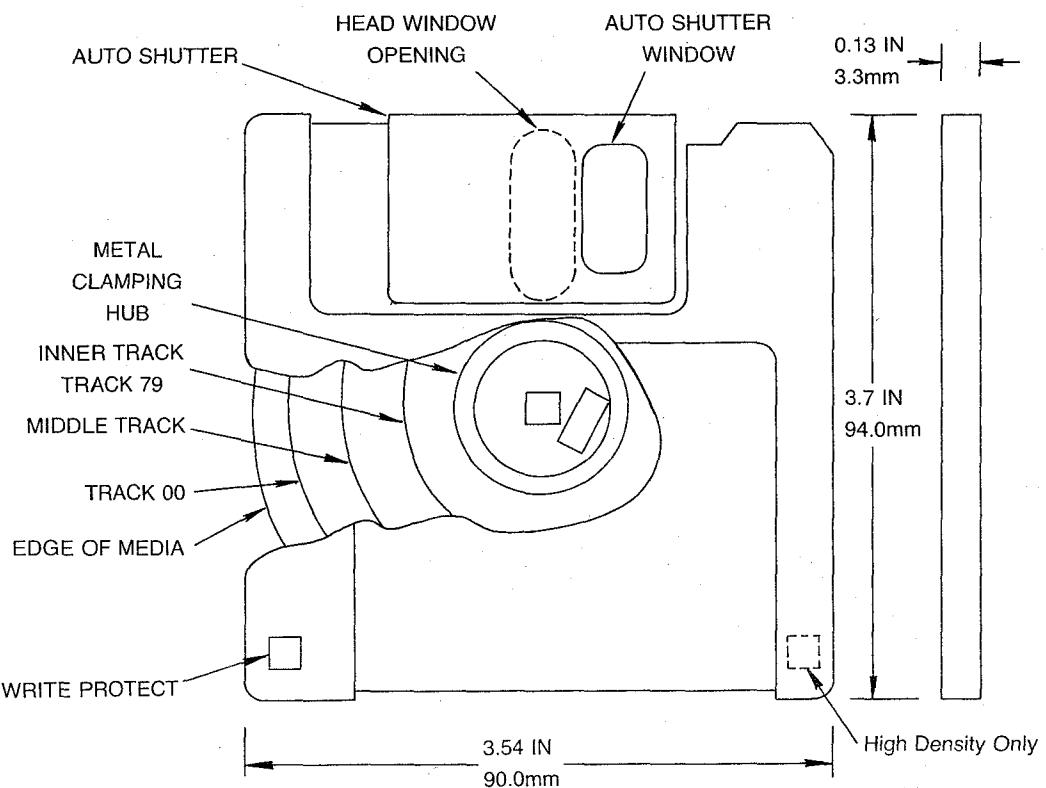


FIGURE A MICROCARTIDGE NOMENCLATURE

WRITE PROTECT FEATURE

The micro cartridge comes with a mechanical write protect tab. To write protect the cartridge, turn the mechanical tab as shown in figure B to uncover the write protect hole.

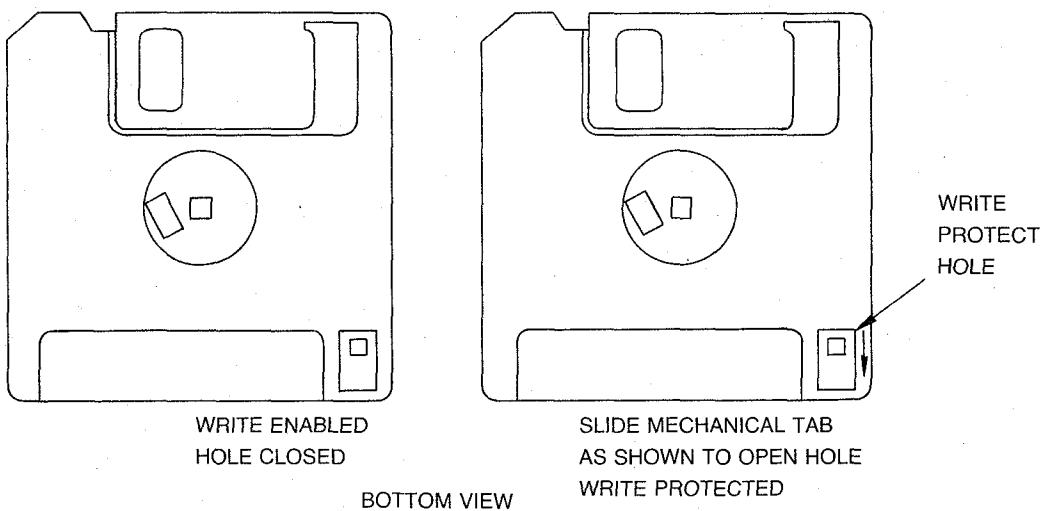
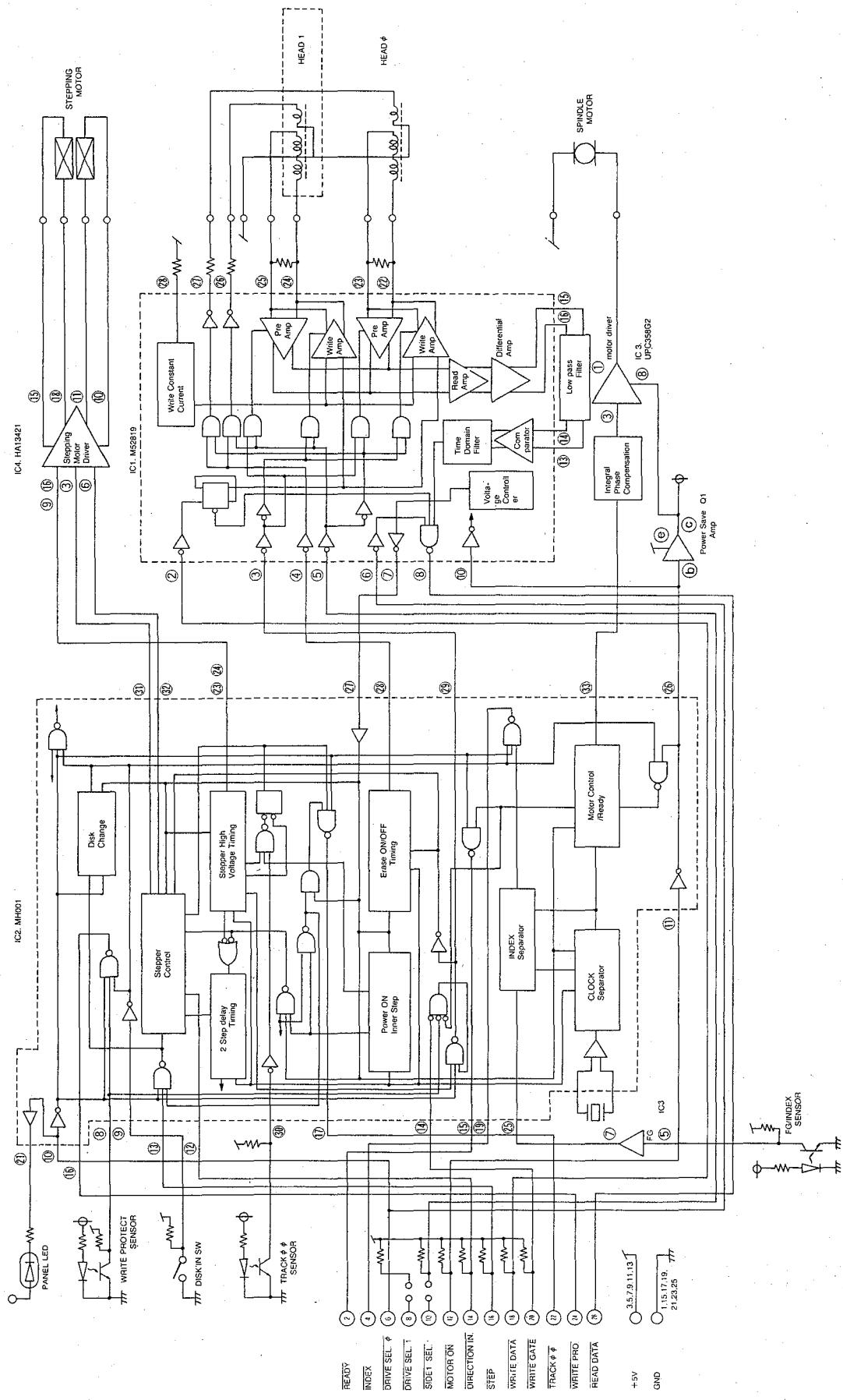


FIGURE B WRITE PROTECT OPERATION

5.5.4 Block Diagram



6. Explanation of Connectors

Connector applications are shown below. For details, refer to table.

CN1	Monitor Connector
CN2	Paper Feed Motor Connector
CN3	Modular Jack Connector
CN4	Carrier Connector
CN5	Carrier Spacing Motor Connector
CN6	FDD Connector
CN7	Power Supply Connector
CN8	Lid Open SW Connector
Co-1A	Monitor Power Supply connector
Co-2A	Synchronous Signal Connector
Co-3A	Bright V.R Connector
Co-1C	Neck Connector
CN101	Keyboard Connector 1
CN102	Keyboard Connector 2
CN103	Keyboard Cable (Curl Cord) Connector
CN500	Carrier Connector

CN 1 Monitor Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	Video	Font Data	OUT
3	HSYNC	Horizontal Synchronous	OUT
4	GND	Ground	
5	VSYNC	Vertical Synchronous	OUT

CN 2 Paper Feed Motor Connector

Pin No.	Signal Name	Description of Signal	Direction
1	LFN	Phase (−) of Paper Feed Motor	OUT
2	LFP	Phase (+) of Paper Feed Motor	OUT
3	LFS	Paper Feed and Carrier Home Sensor	IN
4	GND	Ground	

CN 3 Modular Jack Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	+5V	+5V through R24	OUT
3	SEND C	Keyboard Select C	OUT
4	SEND B	Keyboard Select B	OUT
5	SEND A	Keyboard Select A	OUT
6	SEND CL	Keyboard Scan Clock	OUT
7	RData 2	Receive Data 2	IN
8	RData 1	Receive Data 1	IN

CN 4 Carrier Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	RBS	Ribbon Sensor	IN
3	HSE	Hammer Solenoid Enable	IN
4	HSE	Hammer Solenoid Enable	IN
5	+10V	+10V	OUT
6	+10V	+10V	OUT
7	DSB	Phase B for Daisywheel Motor Drive	OUT
8	RBP	Phase (+) of Ribbon Feed Motor	OUT
9	DSB	Phase B for Daisywheel Motor Drive	OUT
10	RBN	Phase (−) of Ribbon Feed Motor	OUT
11	DSA	Phase A for Daisywheel Motor Drive	OUT
12	DSA	Phase A for Daisywheel Motor Drive	OUT

CN 5 Carrier Spacing Motor Connector

Pin No.	Signal Name	Description of Signal	Direction
1	SCR	Carrier Spacing Motor	OUT
2	SCR	Power Supply	OUT
3	CRA	Phase A for Carrier Spacing Motor Drive	OUT
4	CRA	Phase Ā for Carrier Spacing Motor Drive	OUT
5	CRB	Phase B for Carrier Spacing Motor Drive	OUT
6	CRB	Phase B̄ for Carrier Spacing Motor Drive	OUT

CN 6 FDD Connector

Pin No.	Signal Name	Description of Signal	Direction
1	N.C	Not Connected	
2	<u>READY</u>	READY	IN
3	<u>+5V</u>	+5V	OUT
4	<u>INDEX</u>	INDEX	IN
5	<u>+5V</u>	+5V	OUT
6	<u>DS0</u>	Drive Select 0	OUT
7	<u>+5V</u>	+5V	OUT
8	N.C	Not connected	
9	<u>+5V</u>	+5V	OUT
10	N.C	Not Connected	
11	<u>+5V</u>	+5V	OUT
12	<u>MON</u>	Motor On	OUT
13	<u>+5V</u>	+5V	OUT
14	<u>DIR</u>	Direction select	OUT
15	<u>GND</u>	Ground	
16	<u>STEP</u>	Step	OUT
17	<u>GND</u>	Ground	
18	<u>WDATA</u>	Write data	OUT
19	<u>GND</u>	Ground	
20	<u>WGATE</u>	Write Gate	OUT
21	<u>GND</u>	Ground	
22	<u>TR00</u>	track 00	IN
23	<u>GND</u>	Ground	
24	<u>WRPR</u>	Write Protect	IN
25	<u>GND</u>	Ground	
26	<u>RDATA</u>	Read Data	IN

CN 7 Power Supply Connector

Pin No.	Signal Name	Description of Signal	Direction
1	<u>+5V</u>	+5V	IN
2	<u>+5V</u>	+5V	IN
3	<u>GND</u>	Ground	
4	<u>GND</u>	Ground	
5	<u>+11V</u>	+10V	IN
6	<u>+18V</u>	+18V	IN

CN 8 Lid Open SW Connector

Pin No.	Signal Name	Description of Signal	Direction
1	<u>GND</u>	Ground	
2	<u>LIS</u>	Lid Open SW	IN

CN 101 Keyboard Connector 1

Pin No.	Signal Name	Description of Signal	Direction
1	KS0	Key Strobe	OUT
2	KS1	Key Strobe	OUT
3	KS2	Key Strobe	OUT
4	KS3	Key Strobe	OUT
5	KS4	Key Strobe	OUT
6	KS5	Key Strobe	OUT
7	KS6	Key Strobe	OUT
8	KS7	Key Strobe	OUT
9	KS8	Key Strobe	OUT

CN 102 Keyboard Connector 2

Pin No.	Signal Name	Description of Signal	Direction
1	KD5	Key Data	IN
2	KD4	Key data	IN
3	KD6	Key Data	IN
4	KD7	Key data	IN
5	KD0	Key Data	IN
6	KD1	Key Data	IN
7	KD2	Key data	IN
8	KD3	Key data	IN
9	N.C	Not connected	IN

CN 103 Keyboard Cable (Carl Cord) Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	+5V	+5V	IN
3	SEND C	Keyboard Select C	IN
4	SEND B	Keyboard Select B	IN
5	SEND A	Keyboard Select A	IN
6	SEND CL	Keyboard Scan Clock	IN
7	S Data 2	Send Data 2	OUT
8	S Data 1	Send Data 1	OUT

CN 500 Carrier Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	RBS	Ribbon Sensor	OUT
3	HSE	Hammer Solenoid Enable	OUT
4	HSE	Hammer Solenoid Enable	OUT
5	+10V	+10V	IN
6	+10V	+10V	IN
7	DSB	Phase B for Daisywheel Motor Drive	IN
8	RBP	Phase (+) of Ribbon Feed Motor	IN
9	DSB	Phase B for Daisywheel Motor Drive	IN
10	RBN	Phase (-) of Ribbon Feed Motor	IN
11	DSA	Phase A for Daisywheel Motor Drive	IN
12	DSA	Phase A for Daisywheel Motor Drive	IN

Co-1A Monitor Power Supply Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	+12V	+12V	IN
3	GND	Ground	
4	+30V	+30	IN
5	GND	Ground	

Co-2A Synchronous Signal Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	HSYNC	Horizontal Synchronization	IN
3	GND	Ground	
4	VSYNC	Vertical Synchronization	IN

Co-3A Bright V.R Connector

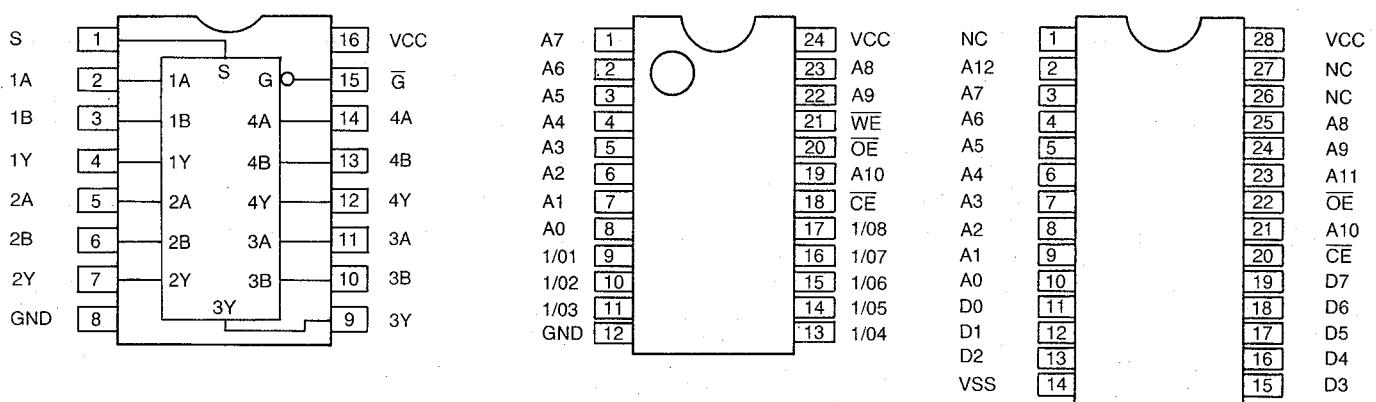
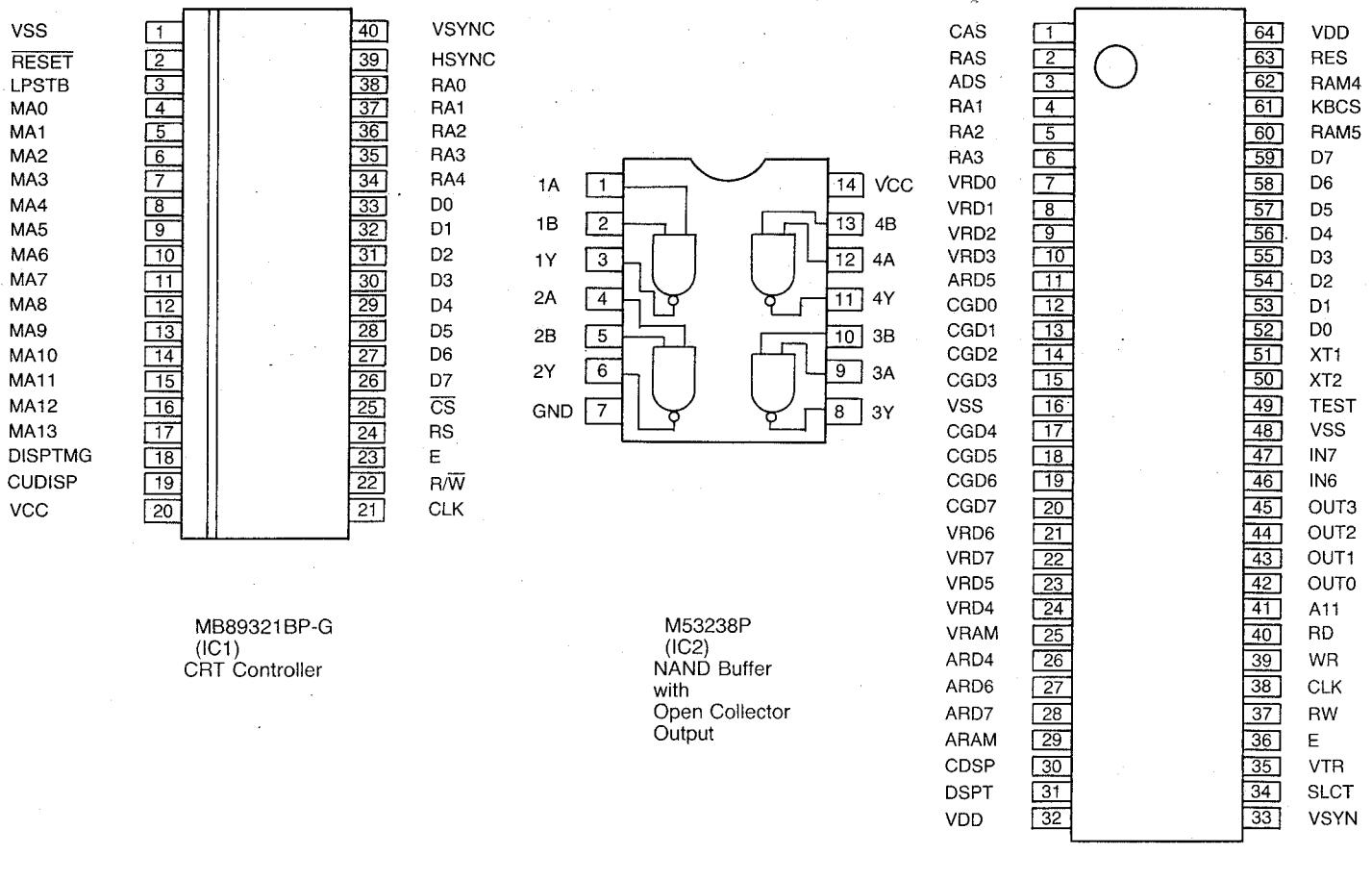
Pin No.	Signal Name	Description of Signal	Direction
1	VRC	Bright V.R Center	
2	VRN	Bright V.R (—) Connector	IN
3	VRP	Bright V.R (+) Connector	IN

Co-1C Neck Connector

Pin No.	Signal Name	Description of Signal	Direction
1	GND	Ground	
2	VIDEO	Font Data	
3	N.C	Not Connected	IN

7. Component Reference Guide

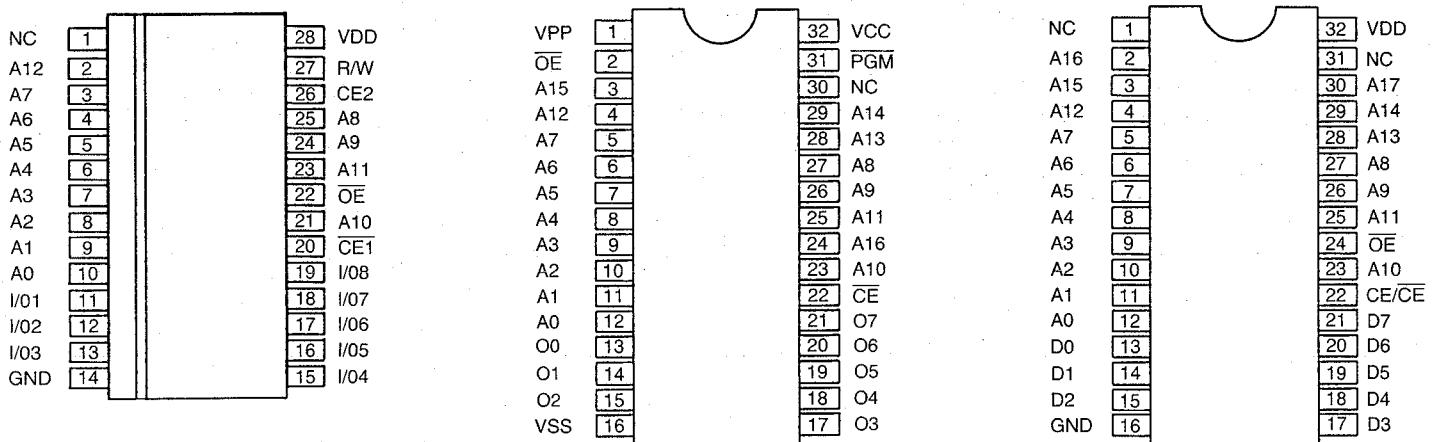
7.1 Logic Board



M74LS157
(IC4,5,6,13,14)
Multiplexer

LC3517AL-10
(IC7,8)
RAM

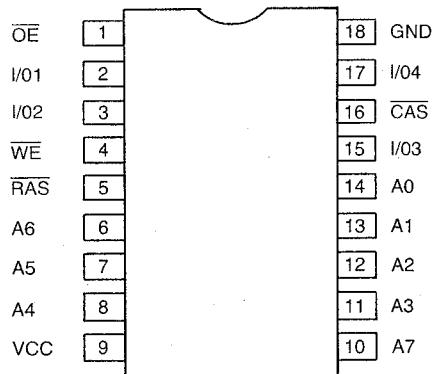
PAWI2W1500MA
(IC9)
ROM



MB8464P-15LL
(IC10)
RAM

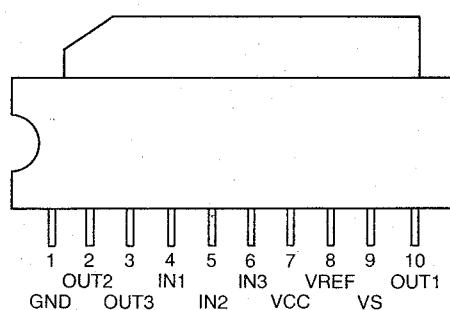
PAWI1W1500MA
(IC11)
EP-ROM

PAWI1W1500MA
(IC12)
ROM

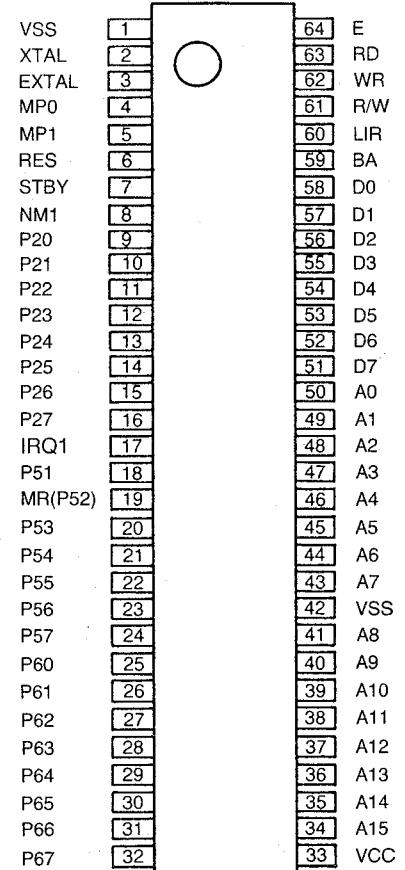


MN41464A-08
(IC15,16)
RAM

MN1280S
(IC17)
RESET IC



TA7288P
(IC20)
Motor Driver



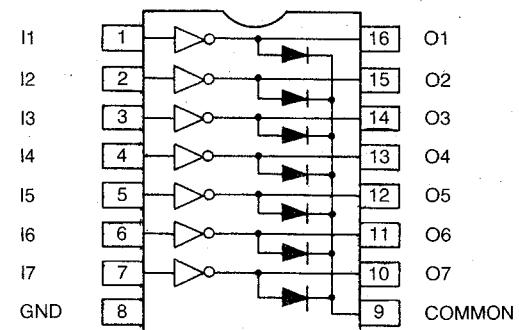
HD63B03X
(IC18)
CPU

NC	1	VCC
RST	2	TEST
TRACK00	3	EPCS
RES	4	EA18
RW/SEEK	5	A10
WR	6	A11
FLCS	7	A12
A0	8	A13
D0	9	EA14
D1	10	EA15
FLT/TRK0	11	EA16
D2	12	EA17
D3	13	A1
D4	14	DRCS
D5	15	ROMCS3
D6	16	ROMCS2
D7	17	ROMCS1
SYNC	18	ROMCS0
INT	19	EXCS
DREQ	20	RAMCS4
OUT0	21	RAMCS3
OUT1	22	RAMCS2
OUT2	23	RAMCS1
OUT3	24	RAMCS0
XT	25	INCS
MRDY	26	KBCS
IRQ1	27	RAMCS5
26Hz	28	ELCS
STBY	29	A15
RES	30	A14
XTAL	31	E
VSS	32	NC

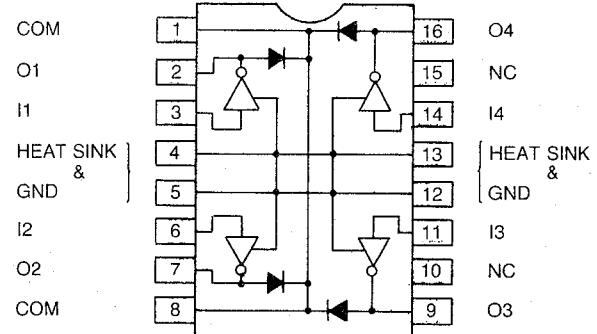
M612106SP
(IC19)
Gate Array

DB6	1	DB5
DB7	2	DB4
DRQ	3	DB3
DACK	4	DB2
TC	5	DB1
INT	6	DB0
XB1	7	GND
XB2	8	A0
EXT	9	CS
XA1	10	WR
XA2	11	RD
GND	12	RESET
GND	13	VDD
RDATA	14	RW/SEEK
WDATA	15	LCT/DIR
PCS0(SYNC)	16	FLTR/STEP
PCS1(WINDOW)	17	HDLD
FMT(MFM)	18	READY
CLKOUT	19	WPRT/2SIDE
INDEX	20	FLT/TRK0
DR1(EM3)	21	WE
DR0(EM2)	22	US0
EM1	23	US1
EM0	24	SIDE

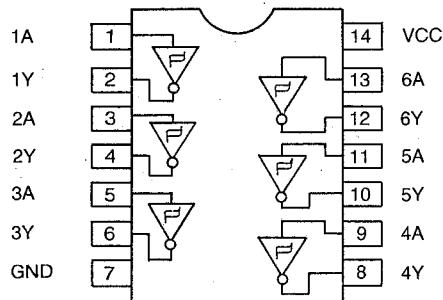
uPD72067C
(IC23)
Floppy Disk Controller



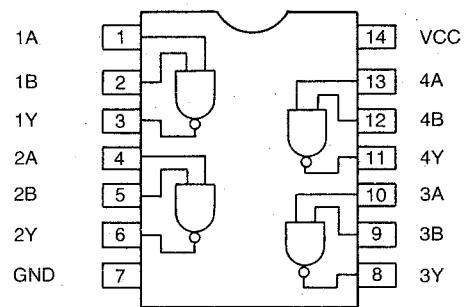
TD62003A
(IC21)
Tr-Array



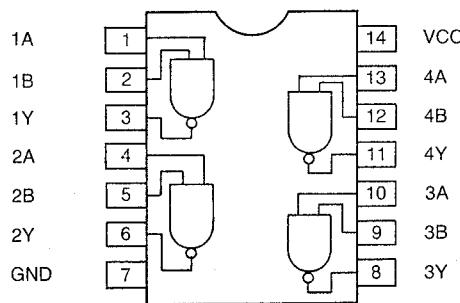
TD62064A
(IC22)
Tr-Array



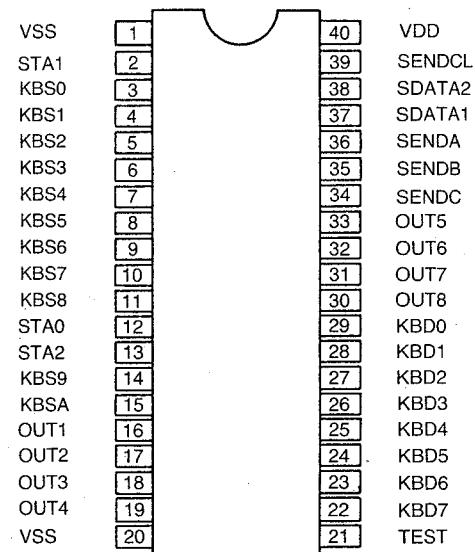
M74LS14
(IC24)
Schmitt Trigger
Inverter



M74LS38
(IC25)
NAND Gate with
Open collector Output

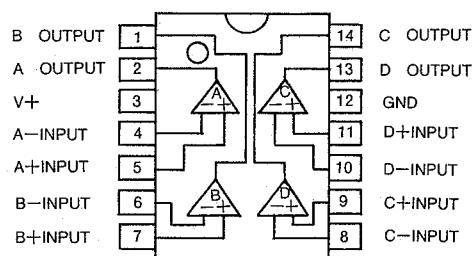


M74LS00
(IC26)
NAND Gate

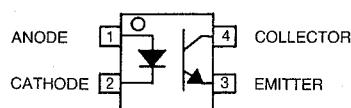


MN51003QPD
(IC101)
Gate Array

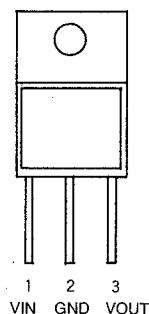
7.2 Power Supply Board



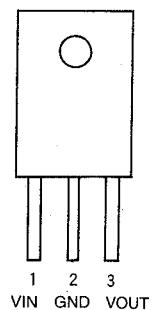
NJM290IN
(IC201)
OP AMP



ON3161
(IC202,203)
Photo Coupler

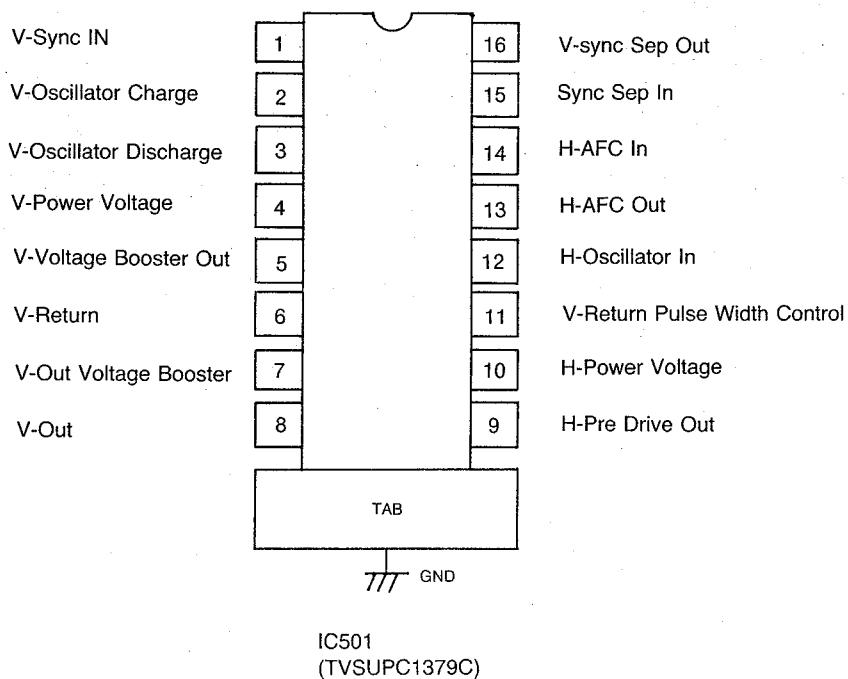


AN7805
(IC251)
Regulator IC



AN78N12
(IC252)
Regulator IC

7.3 CRT Display Circuit Board



Explanation of Pin Function

- “V-Sync IN” is used for Vertical Synchronization Input.
- “V-Oscillator Charge” and “V-Oscillator Discharge” are used for Vertical Oscillation Circuit in IC501. Vertical Oscillation Timing is set by Pin 2 and Pin 3.
- “V-Power Voltage” is Vcc for vertical circuit in this IC.
- “V-Voltage Booster Out”, “V-Return”, “V-Out Voltage Booster”, “V-Return Pulse Width Control” makes vertical amplify circuit.
This circuit makes the vertical signals to deflect the DY.
- “V-Out” is Vertical signal output for DY.
- “V-Sync Sep Out” is not connected.
- “Sync Sep In” is used for horizontal synchronization input.
- “H-AFC In”, “H-AFC Out” makes horizontal AFC circuit.
Pin 13, 14 is used for AFC timing setting.
- “H-Oscillator In” is used for horizontal oscillation setting.
- “H-Power Voltage” is Vcc for horizontal circuit in this IC.
- “H-Pre Drive Out” outputs signals to drive Q502.

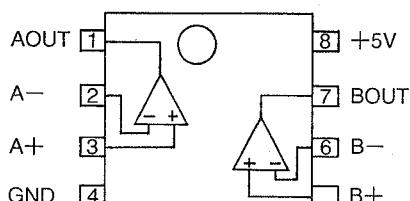
7.4 FDD Unit

GNDA	1		28	WCST
XWRD	2		27	ERS0
XWRG	3		26	ERS1
XERG	4		25	HD1B
XSD1	5		24	HD1A
XDSL	6		23	HD0B
XPON	7		22	HD0A
XRDD	8		21	PAGA
VCCD	9		20	PAGB
PSAV	10		19	VCCA
GNDD	11		18	DFCA
MMVR	12		17	DFCB
CPIB	13		16	DFOA
CPIA	14		15	DFOB

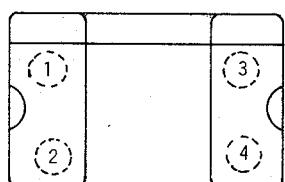
IC1
(M52819)
Read/Write IC

TST2	1		36	VDD
HDI	2		35	RPM
ERAS	3		34	TST1
INSK	4		33	CNT
STPS	5		32	STPA
WRPI	6		31	STPB
XT00	7		30	TK01
XTii	8		29	WRGO
DSKI	9		28	ERGO
DSEL	10		27	REST
MTON	11		26	PDWN
DIRC	12		25	FGII
STEP	13		24	STPV
WRGI	14		23	STPV
REDY	15		22	HDO
WRPO	16		21	LEDI
TK00	17		20	DSCO
GND	18		19	IDXO

IC2
(MH004)
Mechanical and Logic Controller

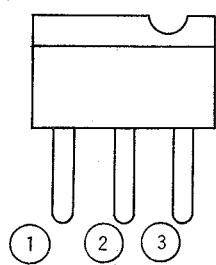


IC3
(upc358G2)
OP Amp



1: Anode
2: Cathode
3: Emitter
4: Collector

PH 101
(GP1S17)
Photo Coupler

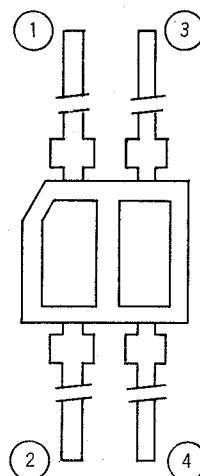


1: Base
2: Collector
3: Emitter

Q5
(2SD973-S)
Transistor

VS2 (01)	1		16	VS1 (01)
VCC	2		15	01 OUT
01 DIRECTION	3		14	01 OUT
GND	4		13	GND
GND	5		12	GND
02 DIRECTION			11	02 OUT
POWER SAVE	7		10	02 OUT
VS2 (02)	8		9	VS1 (02)

IC4
(HA13421)
Stepping Motor Driver



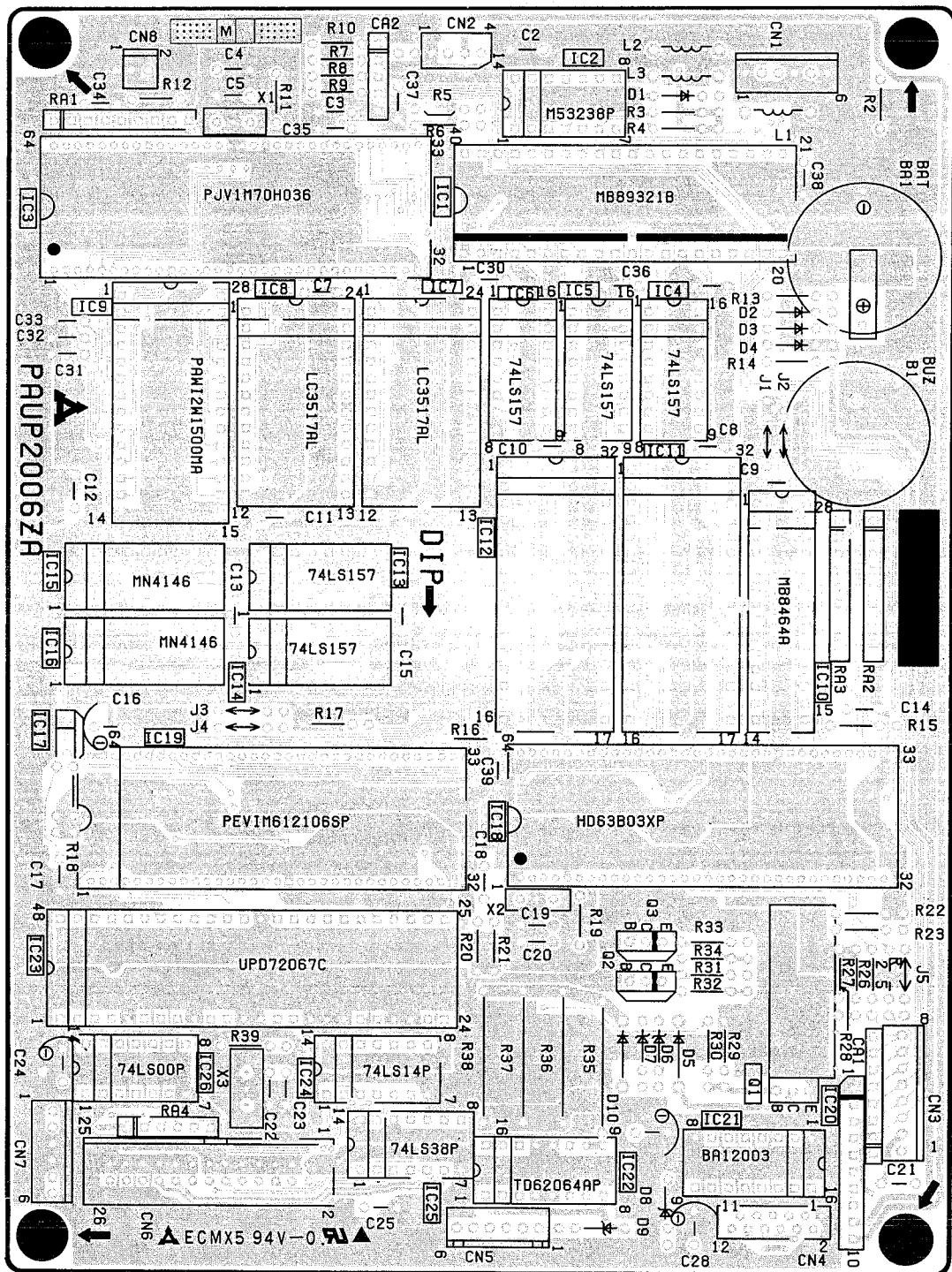
PH 102
(ON2170)
Photo Coupler

1: Anode
2: Cathode
3: Emitter
4: Collector

8. Circuit Board

8.1 Logic Board

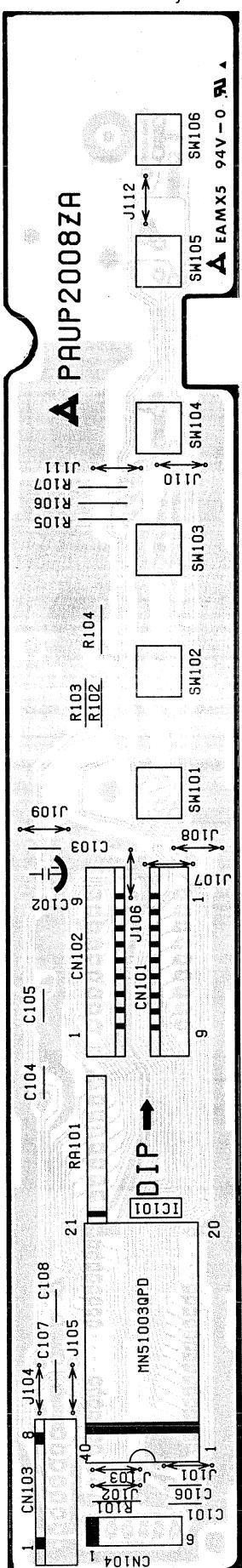
(Parts Side View)



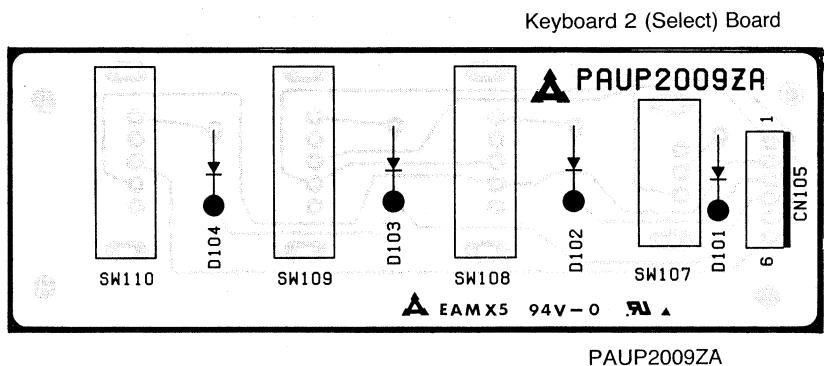
PAUP2006ZA

8.2 Keyboard

(Parts Side View)



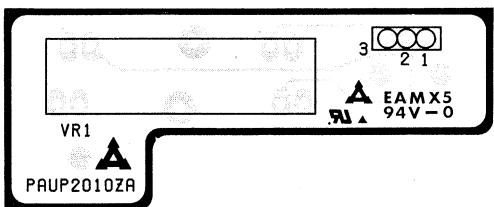
Keyboard 1 (Function) Board



Keyboard 2 (Select) Board

PAUP2009ZA

Brightness Board

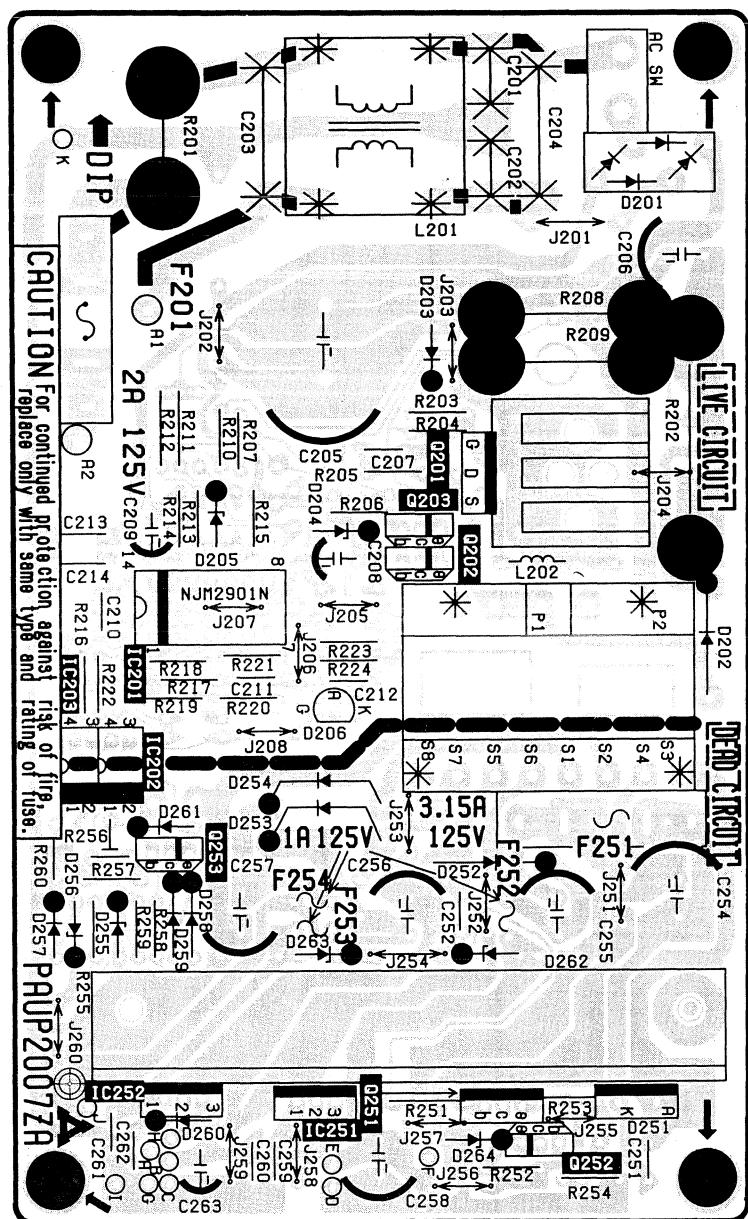


PAUP2010ZA

PAUP2008ZA

8.3 Power Board

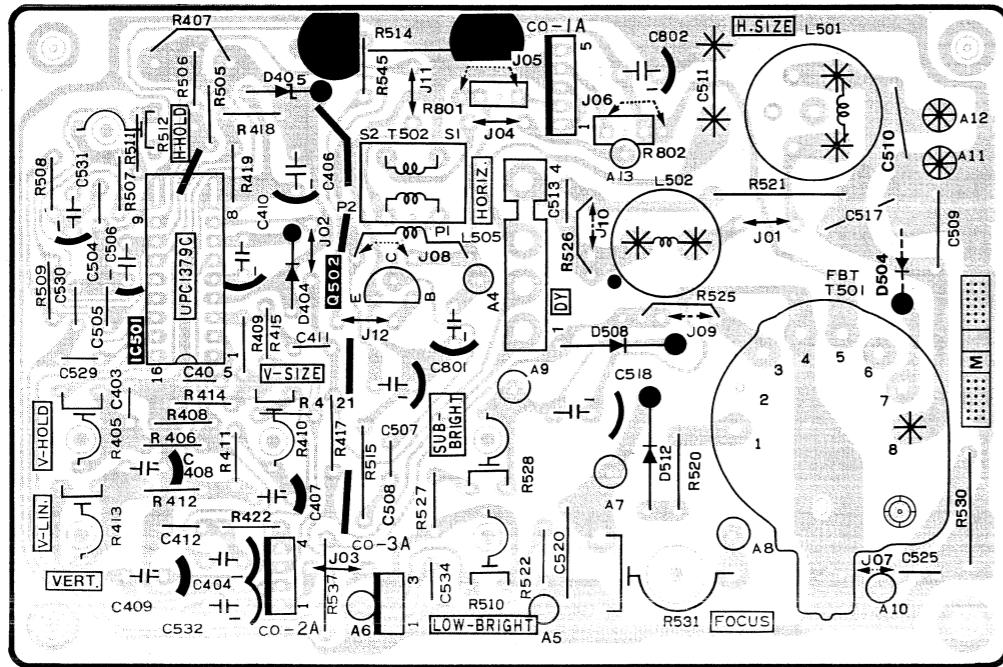
(Parts Side View)



8.4 CRT Display Circuit Board

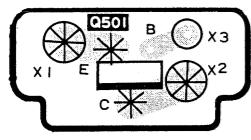
(Parts Side View)

Board-A



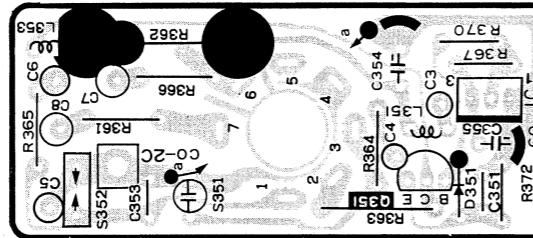
PANP30912AB

Board-X



PANP31723ZA

Board-C

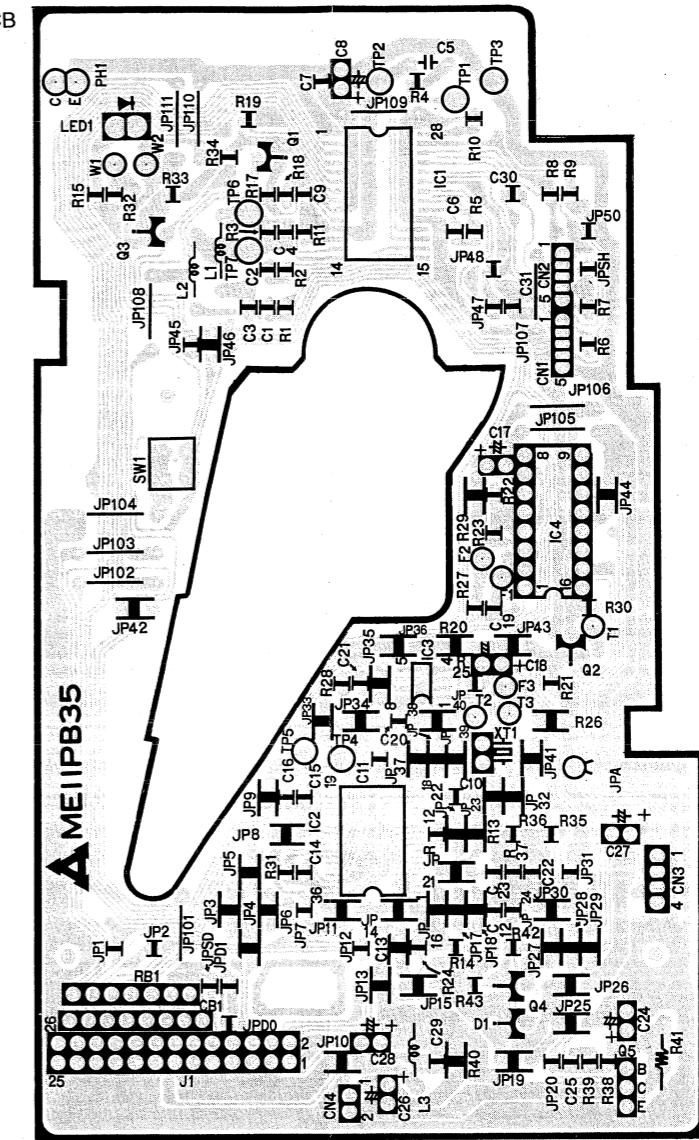


PANP31411AB

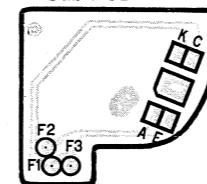
8.5 FDD Board

solder Side

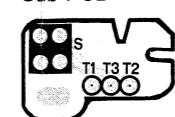
Main PCB



Index Sensor Sub PCB



Track00 Sensor Sub PCB

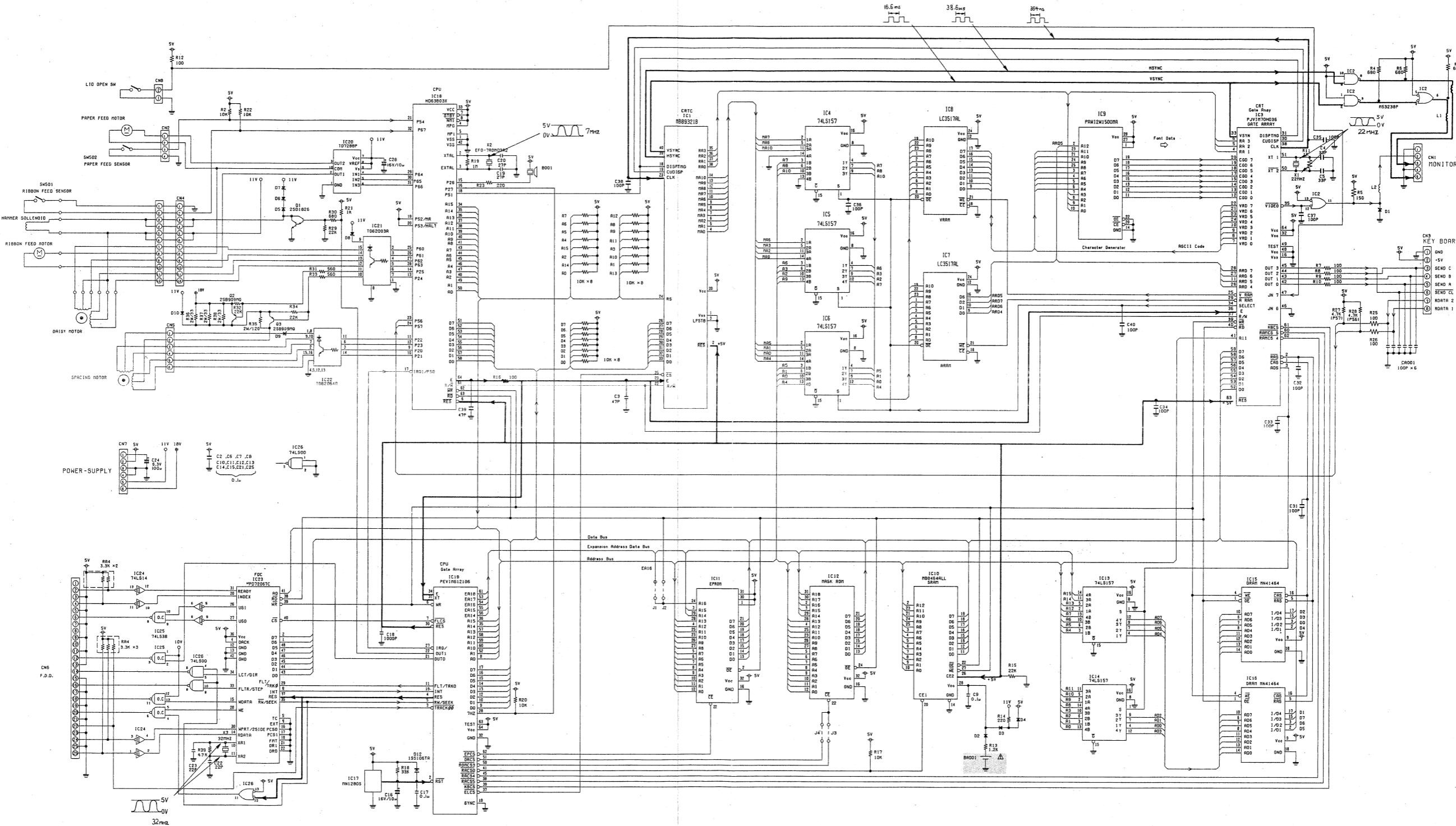


Write Protect Sensor
Sub PCB



9. Schematic Diagram

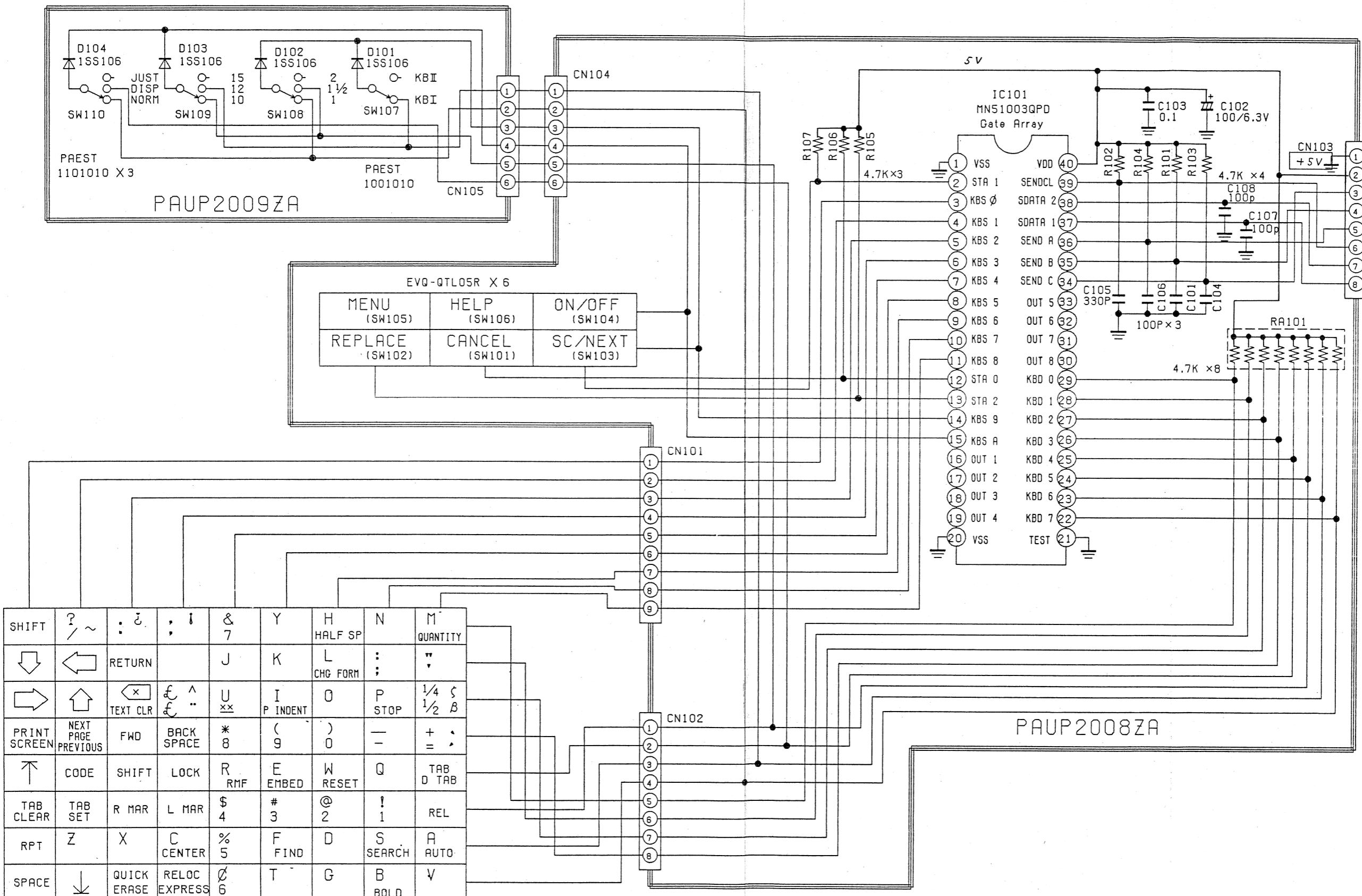
9.1 Logic Board Schematic



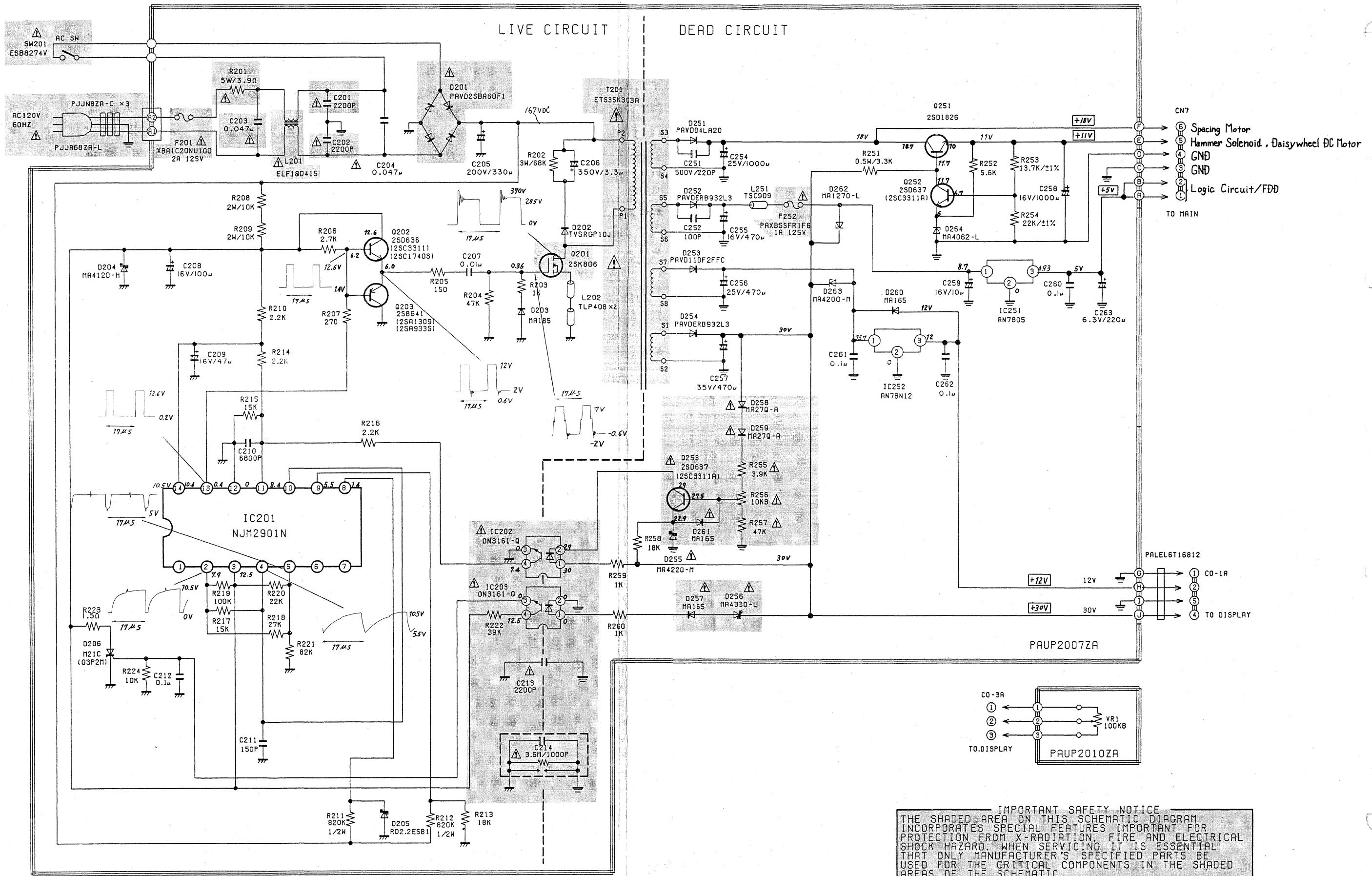
— Important safety notice —

Important Safety Notice
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

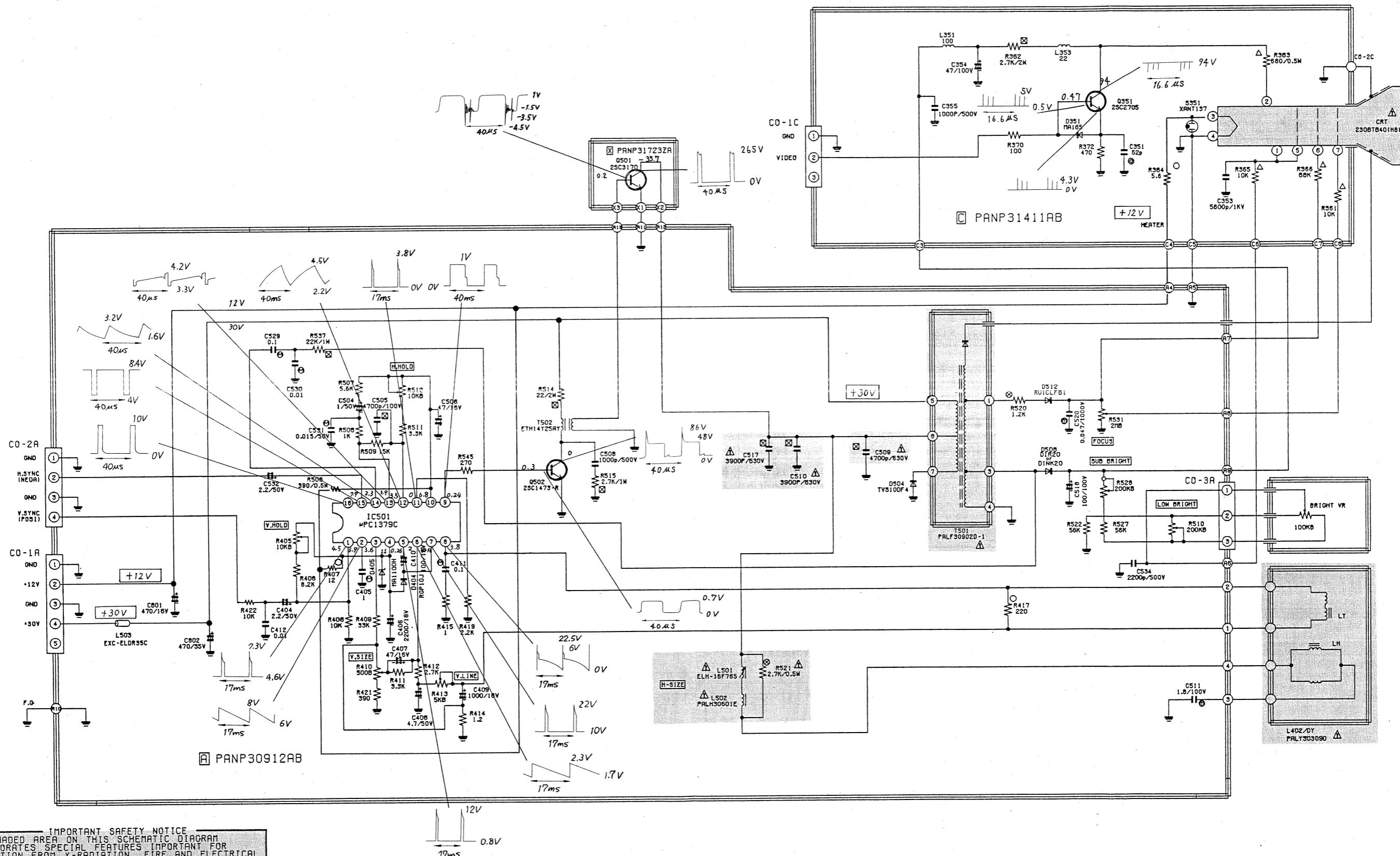
9.2 Keyboard Schematic



9.3 Power Supply Schematic

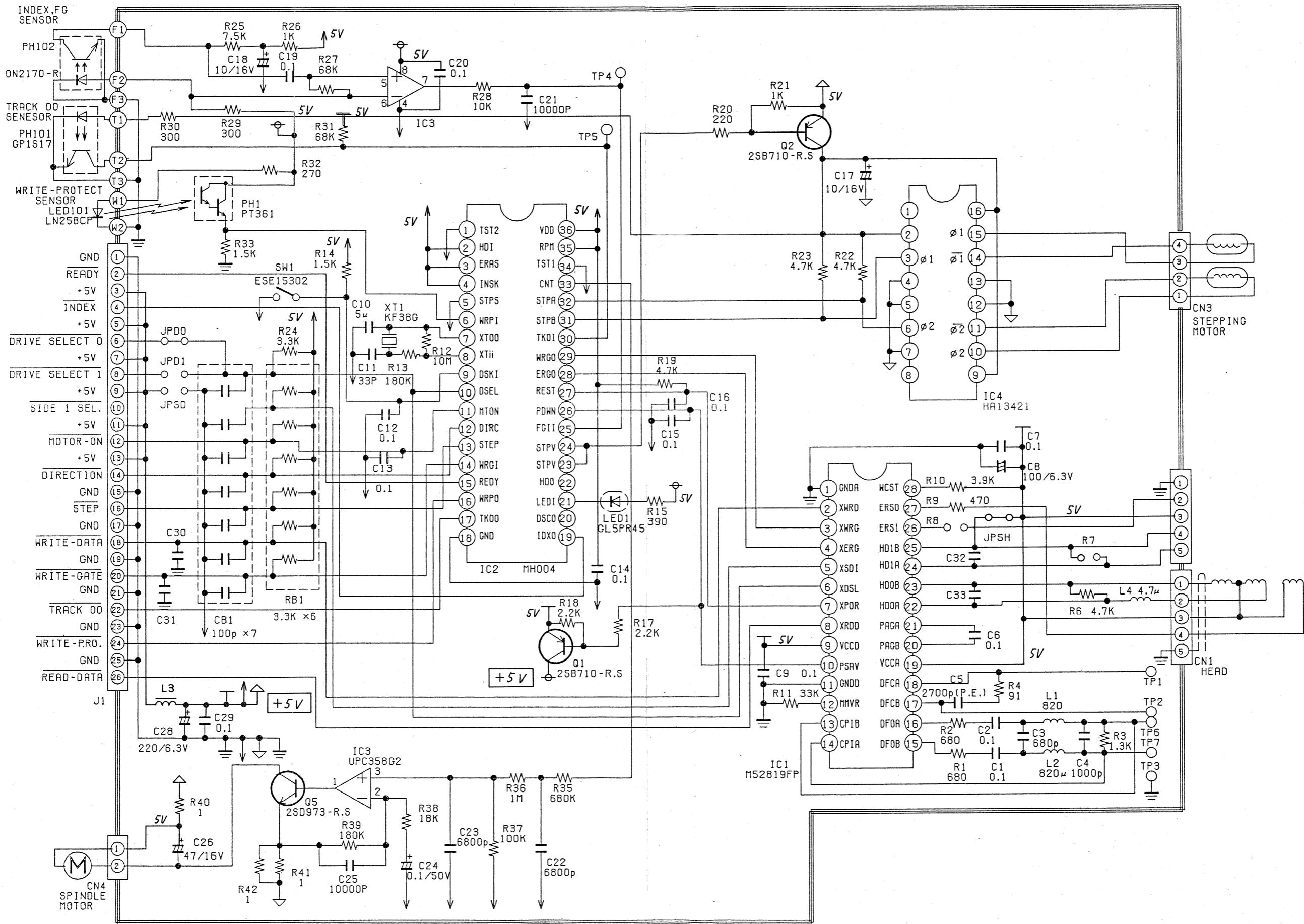


9.4 CRT Display Circuit Board Schematic



IMPORTANT SAFETY NOTICE
THE SHADeD AREA ON THIS SCHEMATIC DIAGRAM
INCORPORATES SPECIAL FEATURES IMPORTANT FOR
PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL
SHOCK HAZARD. WHEN SERVICING IT IS ESSENTIAL
THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE
USED FOR THE CRITICAL COMPONENTS IN THE SHADeD
AREAS OF THE SCHEMATIC.

9.5 Floppy Disk Drive Board Schematic



10. Test Program

(1) Push the power switch while pressing and holding the **T** and **T** keys, until the unit goes into "Test Mode" and the following menu appears on the screen.

KX-W1500 TEST MODE
1. Keyboard check
2. ROM check
3. Test Pattern (1) Center Marker
4. Test Pattern (2) V-Linearity
5. Test Pattern (3) Character
6. FDD Check (1) Formatting
7. FDD Check (2) R/W (Read/Write)
8. RAM Check

(2) Press the number [1] to [8] keys to run the desired program.

note: When the program is finished, the test program goes into a wait condition until another key is pressed. Pressing the [MENU] key, will return the test menu to the screen.

1. Keyboard Check

Slide the four left top slide switches to the "NORMAL", "10", "1" and "KBI" positions respectively; then press all of the other keys one by one, and from left to right, starting with the [CANCEL] key.

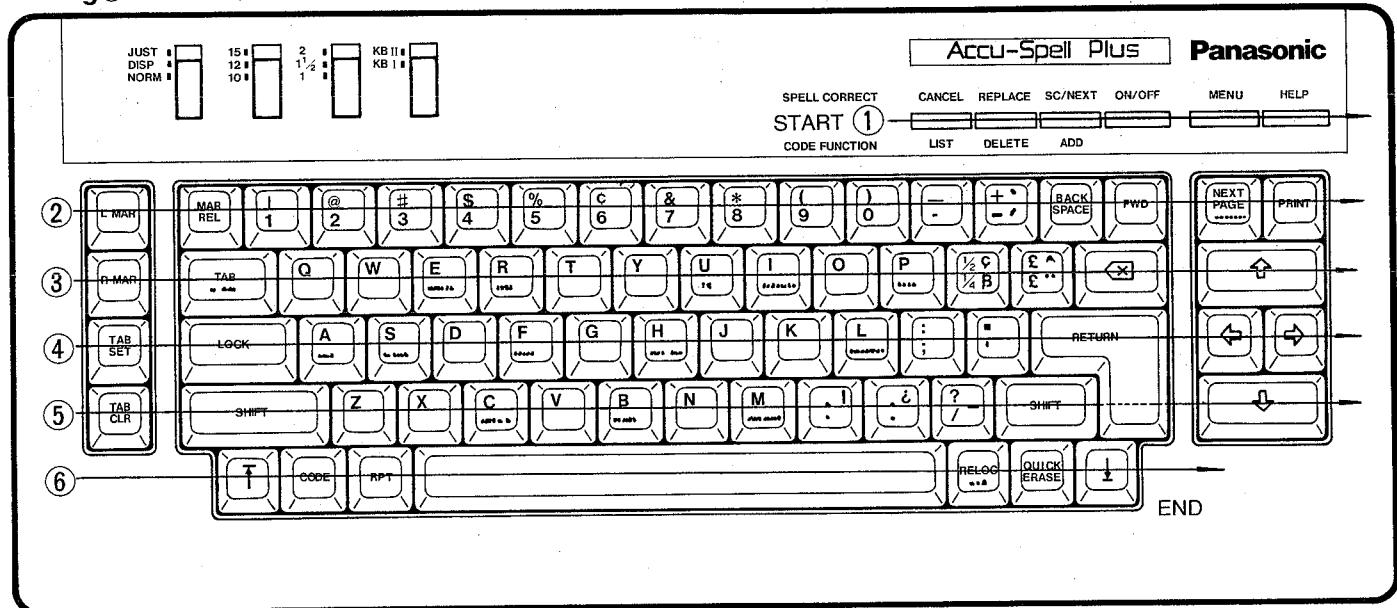
The result of the tests are displayed as follows:

OUTPUT \ RESULT	OK	NG	
SCREEN	KEYBOARD CHECK OK!	<ul style="list-style-type: none">• KEYBOARD CHECK NG!• T-OUT• SLIDE NG	T-OUT = Time Out NG = No Good
PRINTER	KEY-OK	KEY-NG	

note:

(a). Observe the direction of the arrows in Fig(A).

Fig(A)



(b). Press the [RETURN] key only after pressing the [;] key.

(c). Press each key in the proper order.

(d). Do not press the duplicate keys (shift etc.) at the same time.

(e). Do not pause for more than five seconds while pressing the keys.

If these procedures are not followed, "T-OUT" will appear on the screen.

If slide switches are not set properly, "SLIDE NG" will appear on the screen and the operation will pause for five seconds, after which time you may correct the error and redo the test, or select another test.

If a key is pressed for more than five seconds, "T-OUT" will appear on the screen.

2. ROM Check

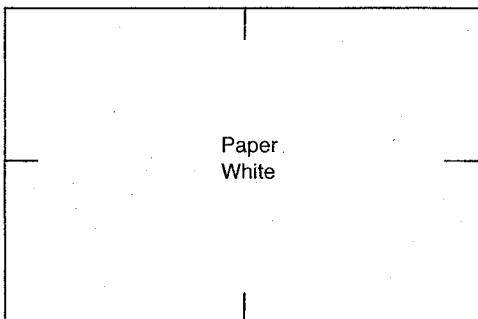
When the check sum value memorized in ROM is equal to the result of the test check sum, "ROM-OK" will appear on the screen and be printed. Otherwise, "ROM-NG" will be displayed and printed.

The results of the tests are displayed as follows:

OUTPUT \ RESULT	OK	NG
SCREEN	ROM-OK	ROM-NG
PRINTER	SUM=**** ROM-OK	SUM=**** ROM-NG

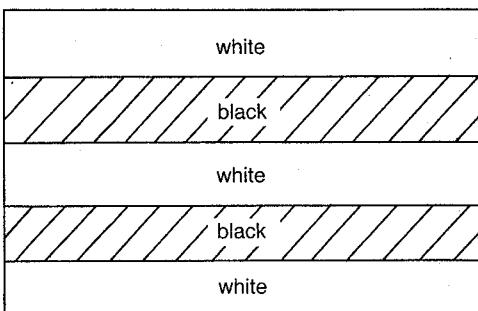
3. Test Pattern (1) Center Marker

The following pattern appears on the screen.



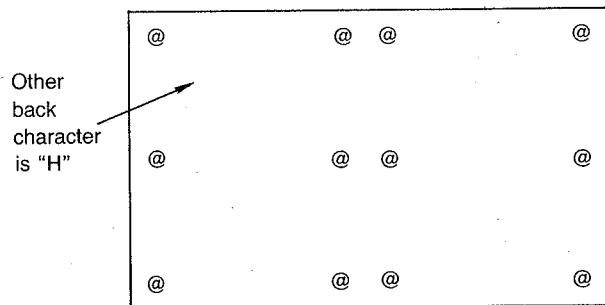
4. Test Pattern (2) V-Linearity

The following pattern appears on the screen.



5. Test Pattern (3) Character

The following pattern appears on the screen.



White pattern with center marker

- (a) Vertical/Horizontal size adjustment
- (b) Brightness adjustment
- (c) Vertical/Horizontal center adjustment

Use the same procedure as on pages 36, 38.

Vertical linearity adjustment pattern

Measure white patterns using the same procedure as page 37 (f).

"H" character pattern.

- a. Focus adjustment
- b. Over all check

Use the same procedure as on page 37.

6. FDD Check (1) Formatting

This program automatically formats a floppy disk.

Note: This test will destroy all data on the disk.

The results of this tests are displayed as follows:

RESULT OUTPUT	OK	NG
SCREEN	Formatting OK!	Disk Error!! Protected Disk!! No Disk!!
PRINTER	FORMAT-OK	FORMAT-NG

7. FDD Check (2) R/W (Read/Write)

This program automatically writes certain data to tracks 0, 40 and 79 of the disk. It then reads the disk and checks the data to see if it is correct or not.

The results of the tests are displayed as follows:

RESULT OUTPUT	OK	NG
SCREEN	FDD R/W OK!	<ul style="list-style-type: none"> • Protected Disk!! • No Disk!! • WRITE ERROR • READ ERROR
PRINTER	FDD R/W-OK	FDD R/W-NG

8. RAM Check

The program automatically writes to and reads from the SRAM and DRAM, and those result as follows:

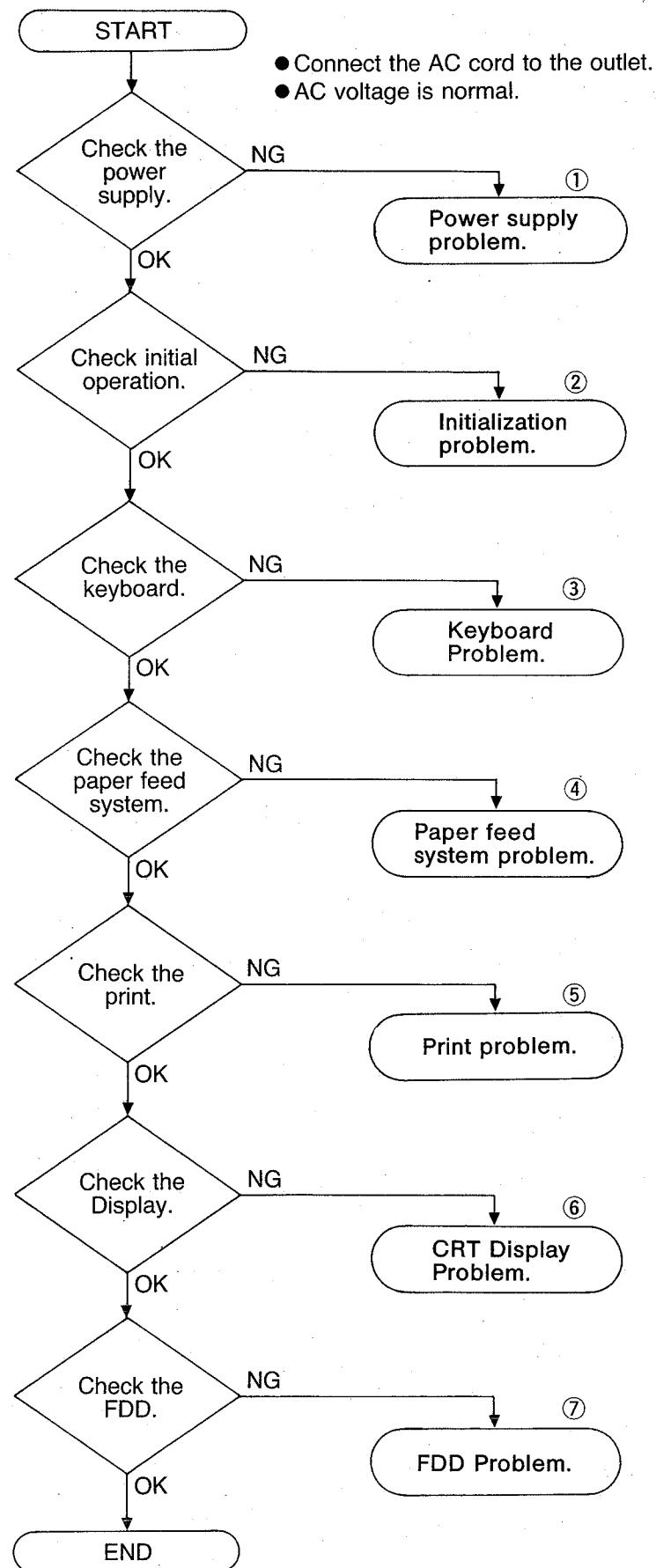
RESULT OUTPUT	OK	NG
SCREEN	RAM-OK	SRAM-NG DRAM-NG
PRINTER	RAM-OK	RAM-NG

SRAM = IC 10
DRAM = IC 15, 16

Other Special Functions

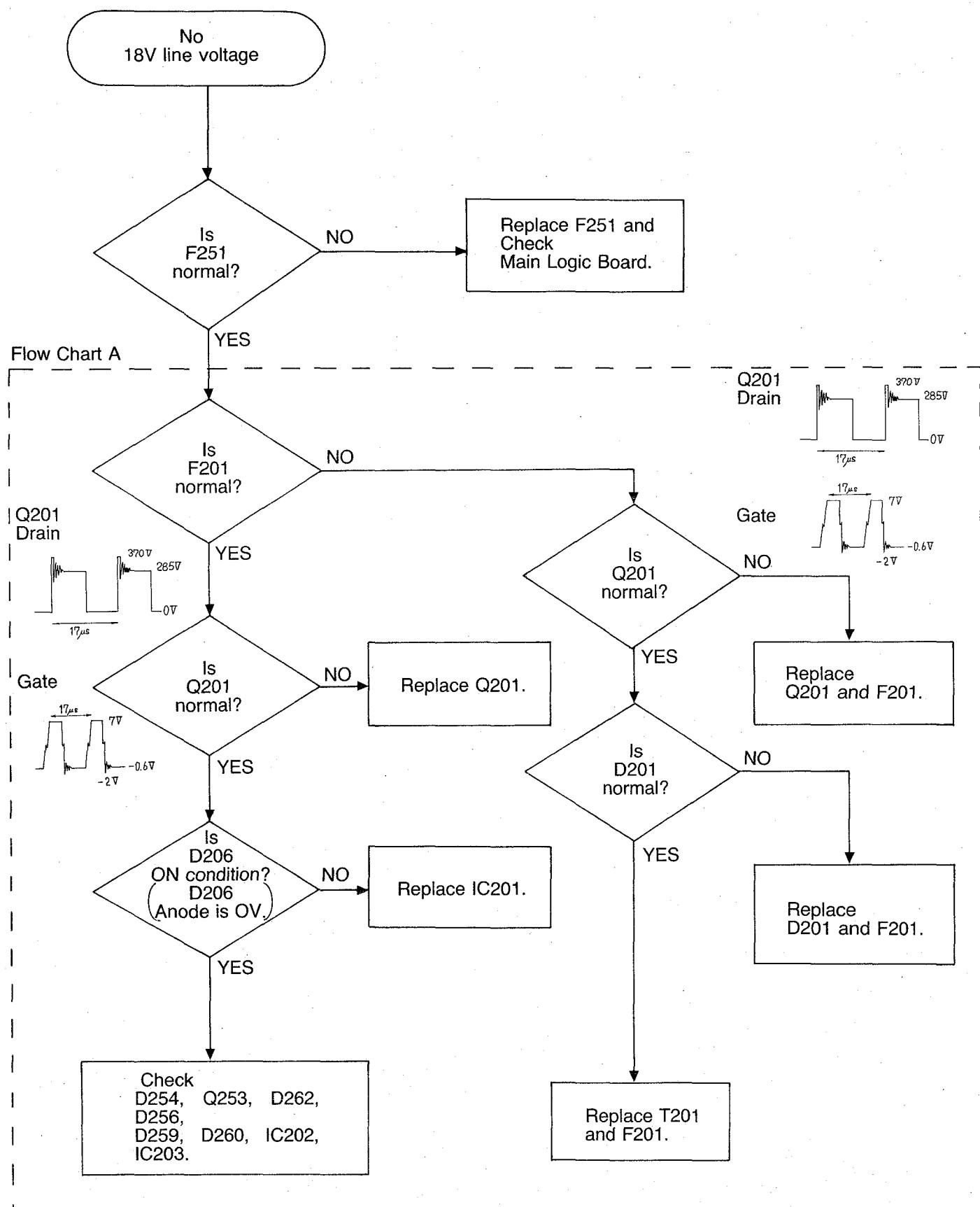
- [SHIFT] + [RPT] : Daisywheel Home Adjustment
- [SHIFT] + [TAB CLR] : Demo
- [SHIFT] + [CODE] : Clears SRAM (margins, tabs, user dictionary, text/phrase memory)

11. Trouble Shooting Flow Chart

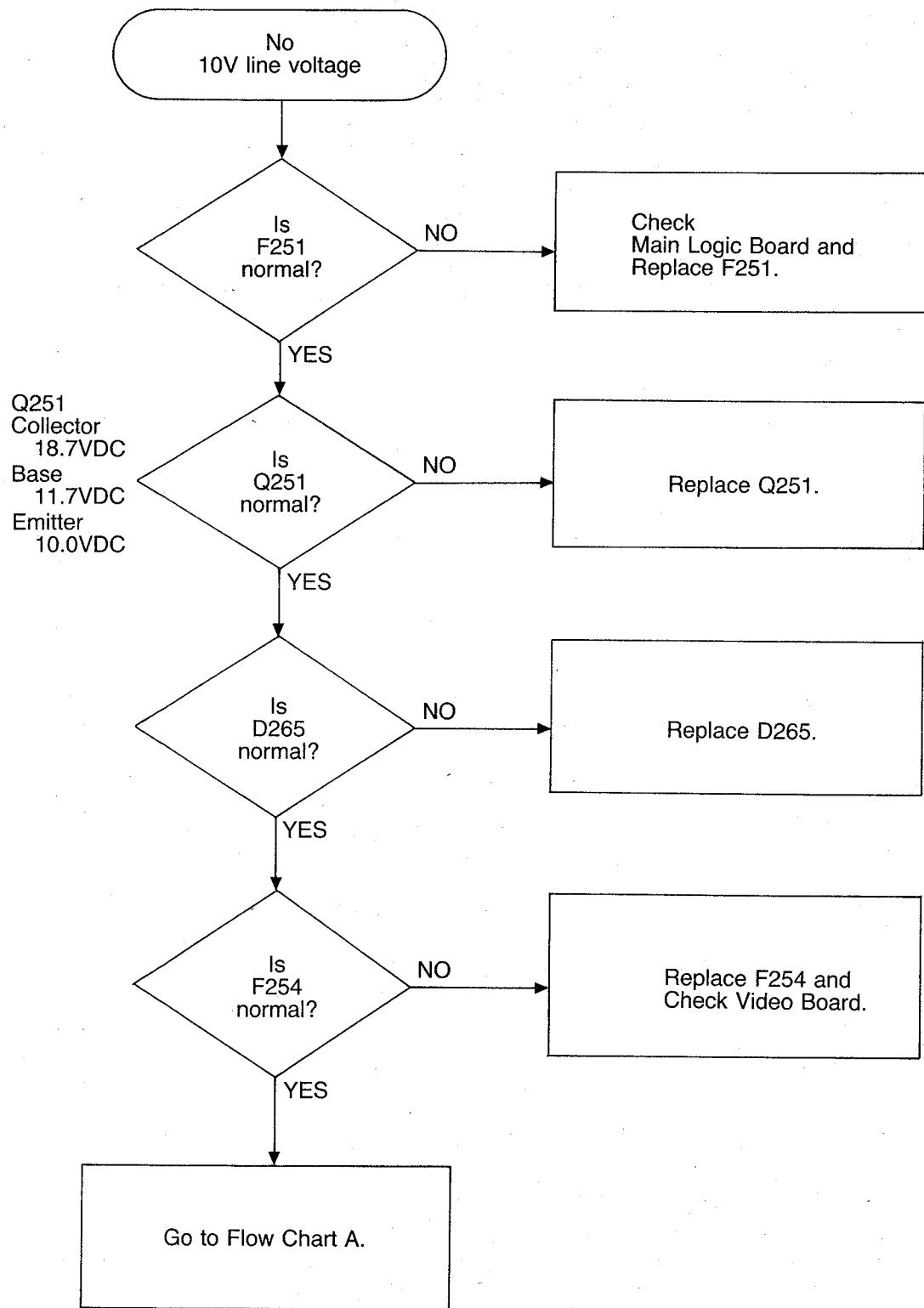


① Power Supply Problem

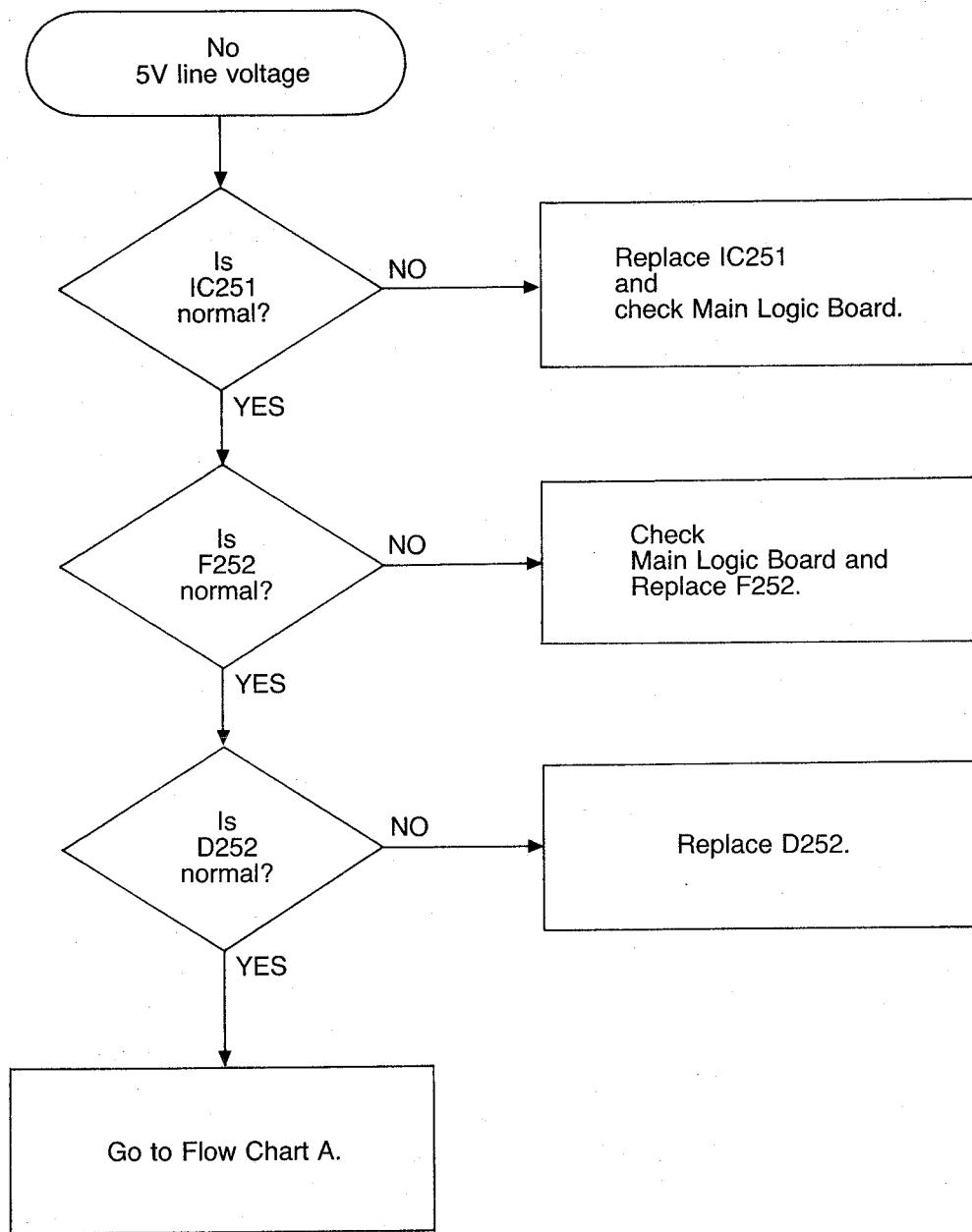
a. No 18V line voltage



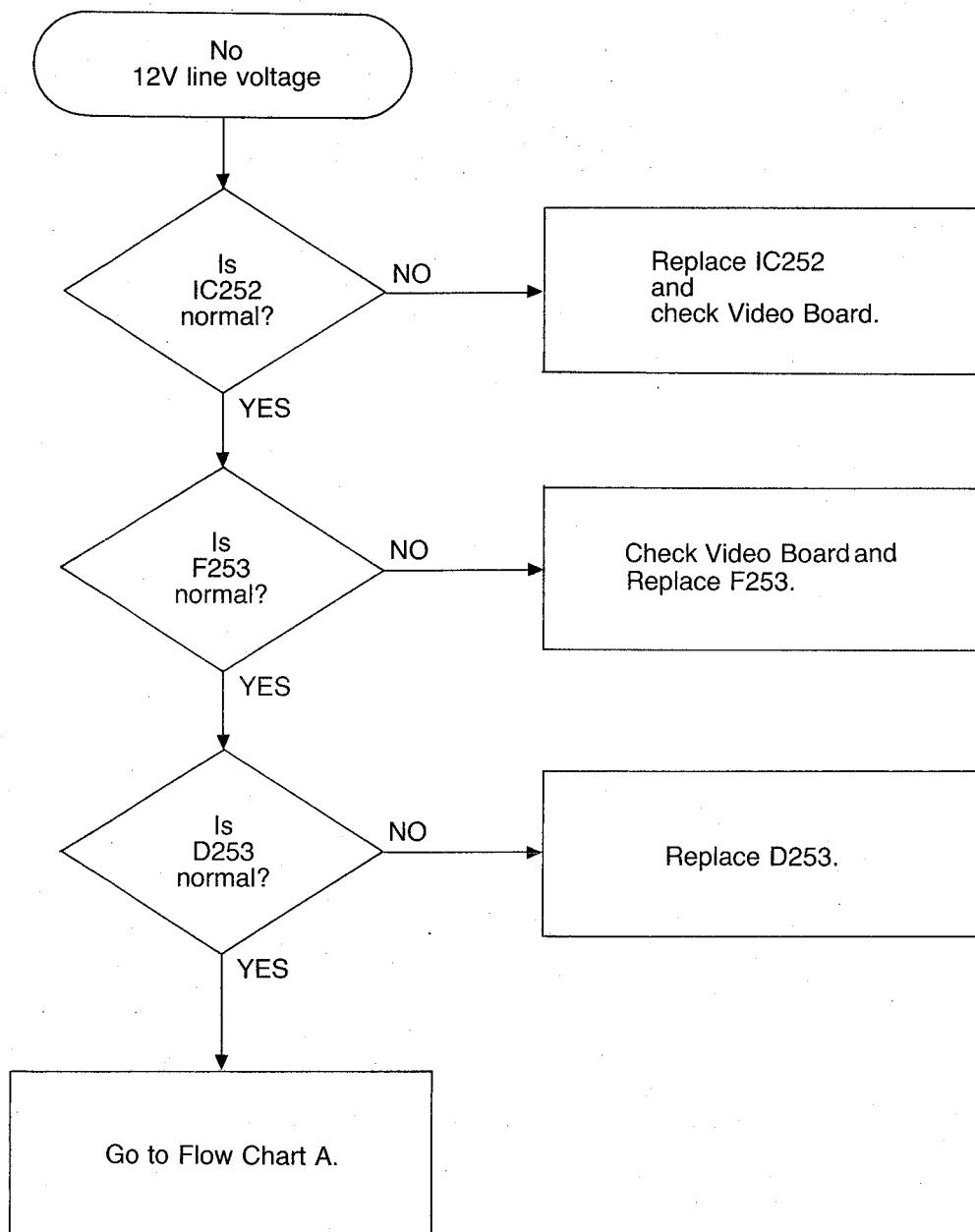
b. No 10V line voltage



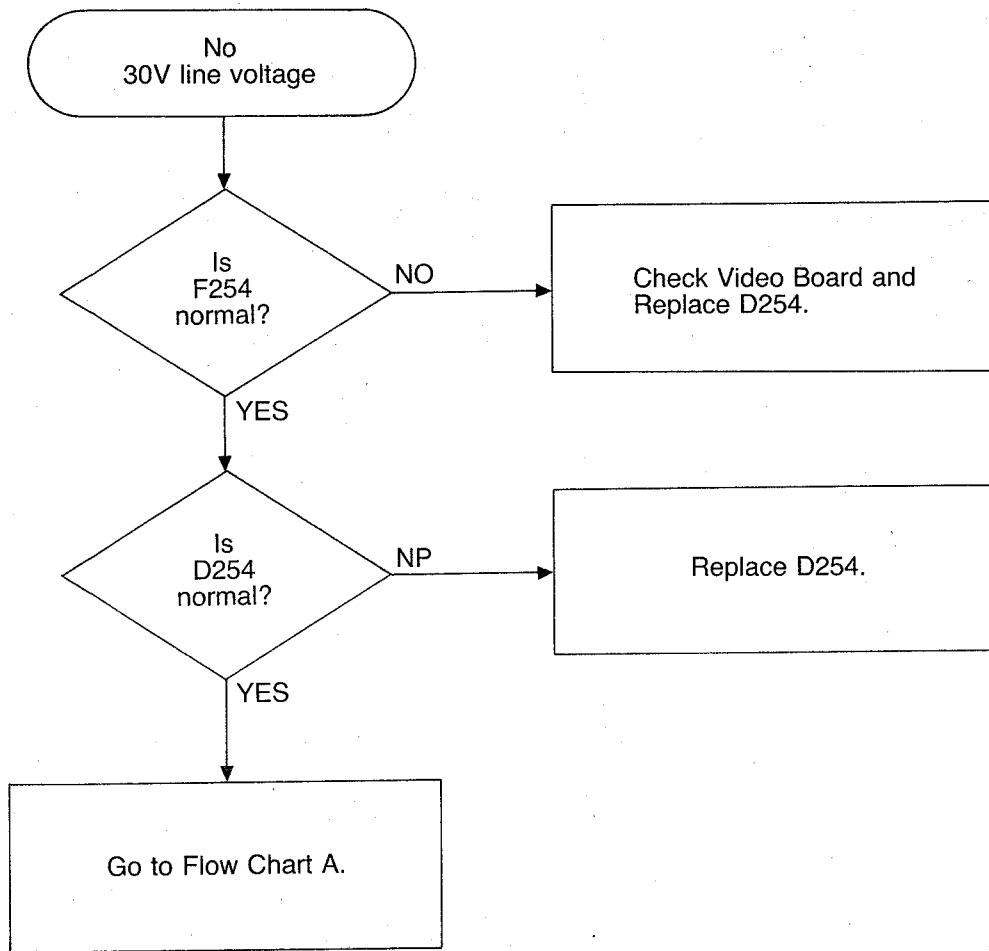
c. No 5V line voltage



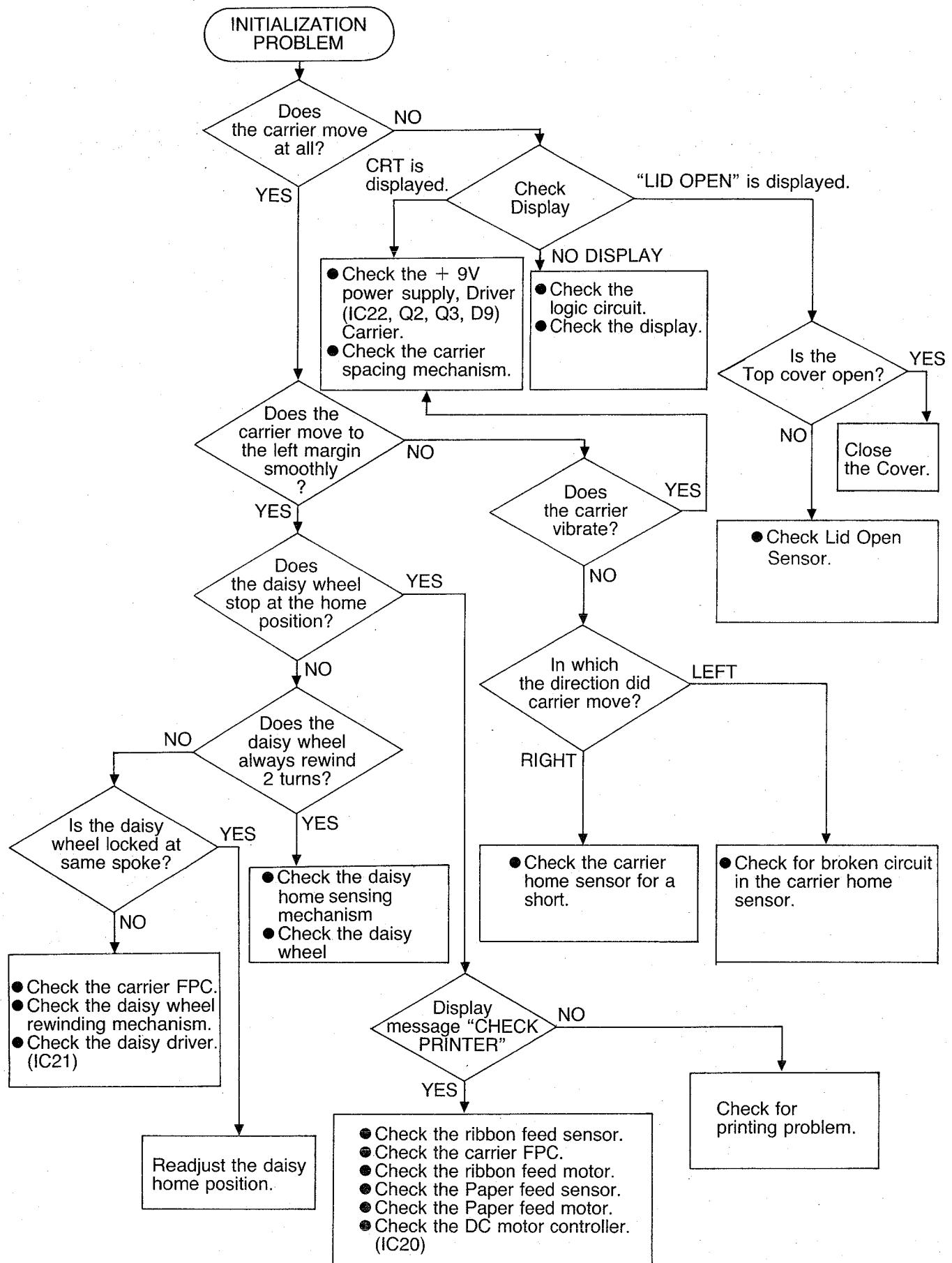
d. No 12V line voltage



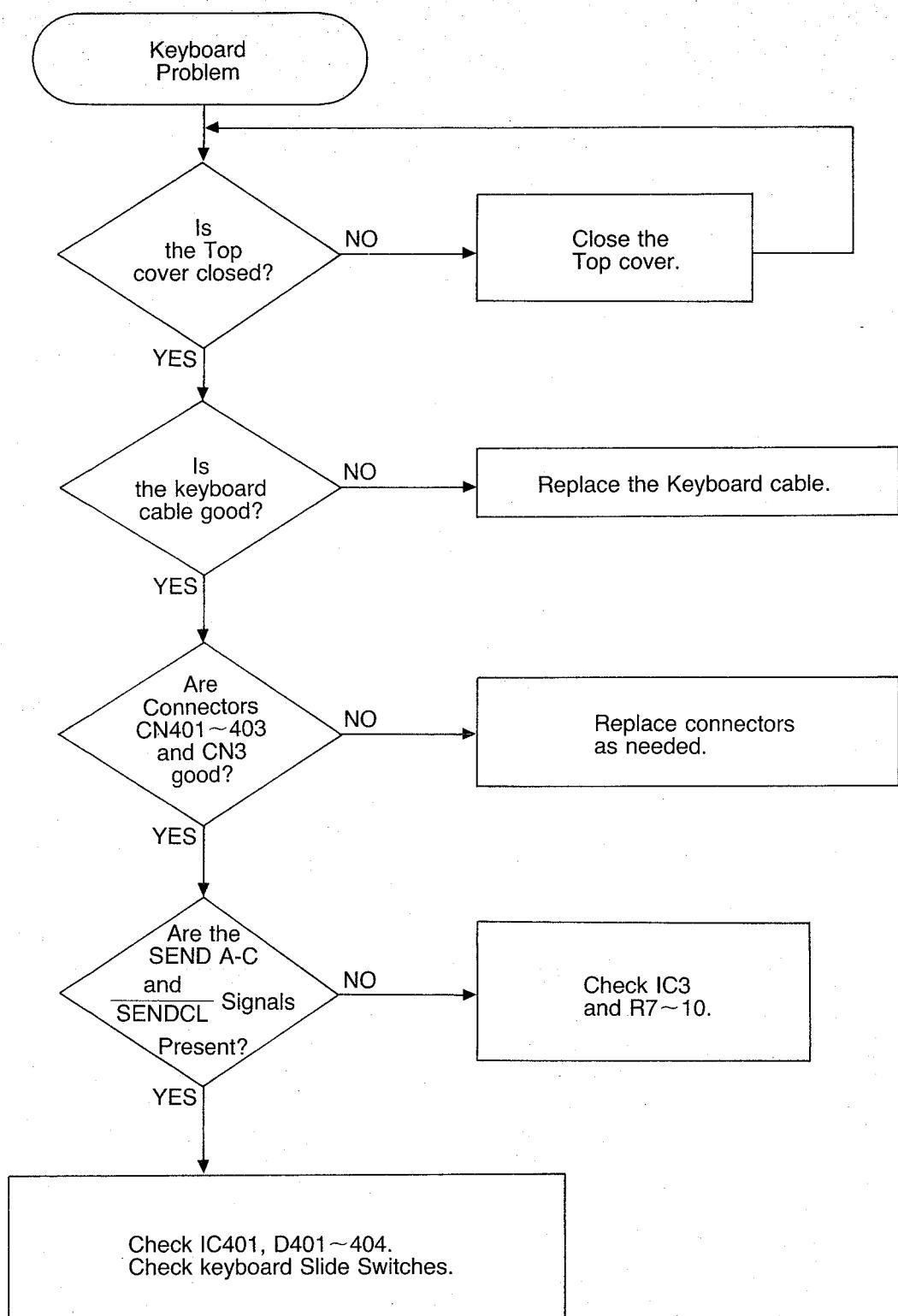
e. No 30V line voltage



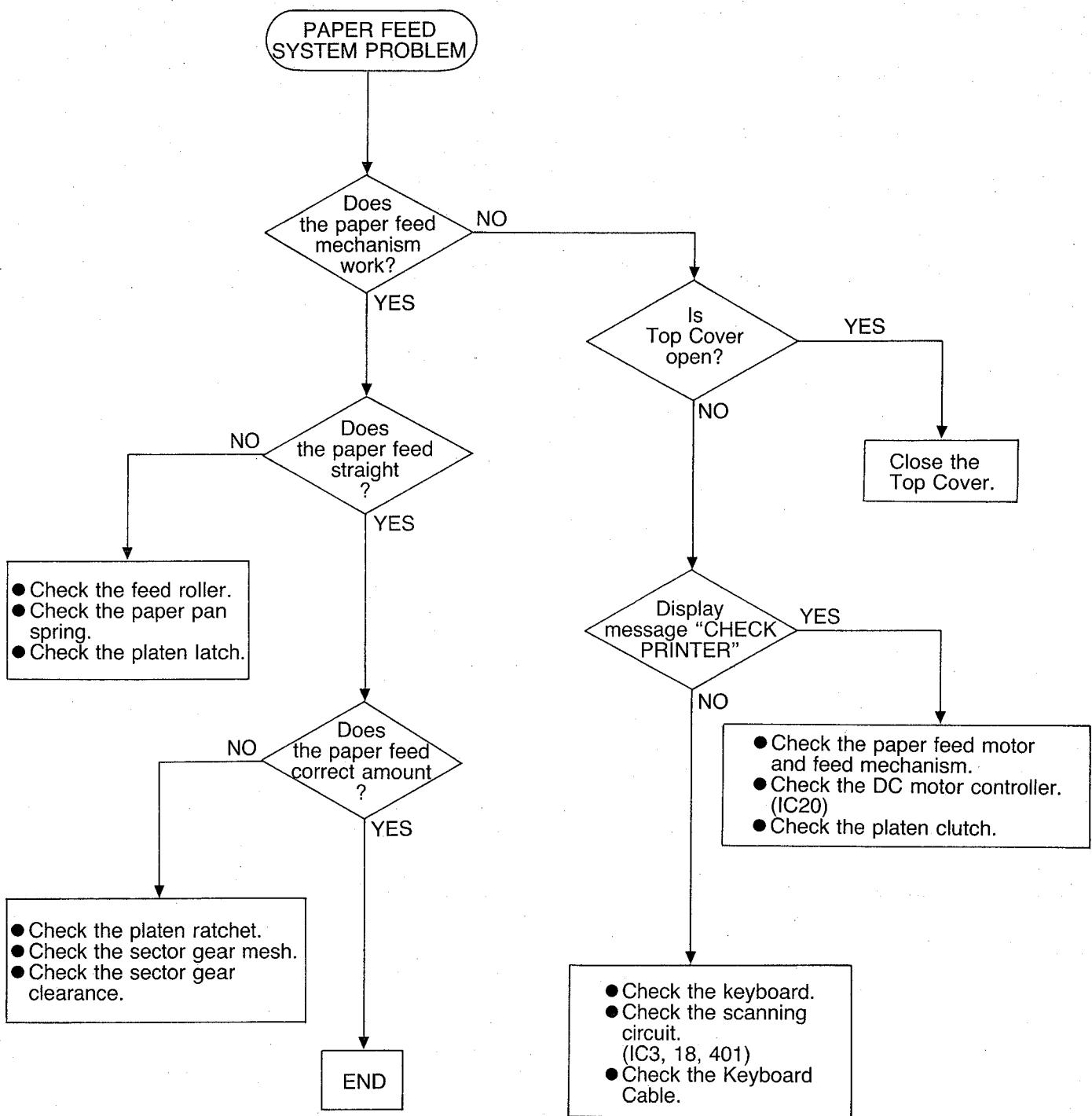
② Initialization Problem



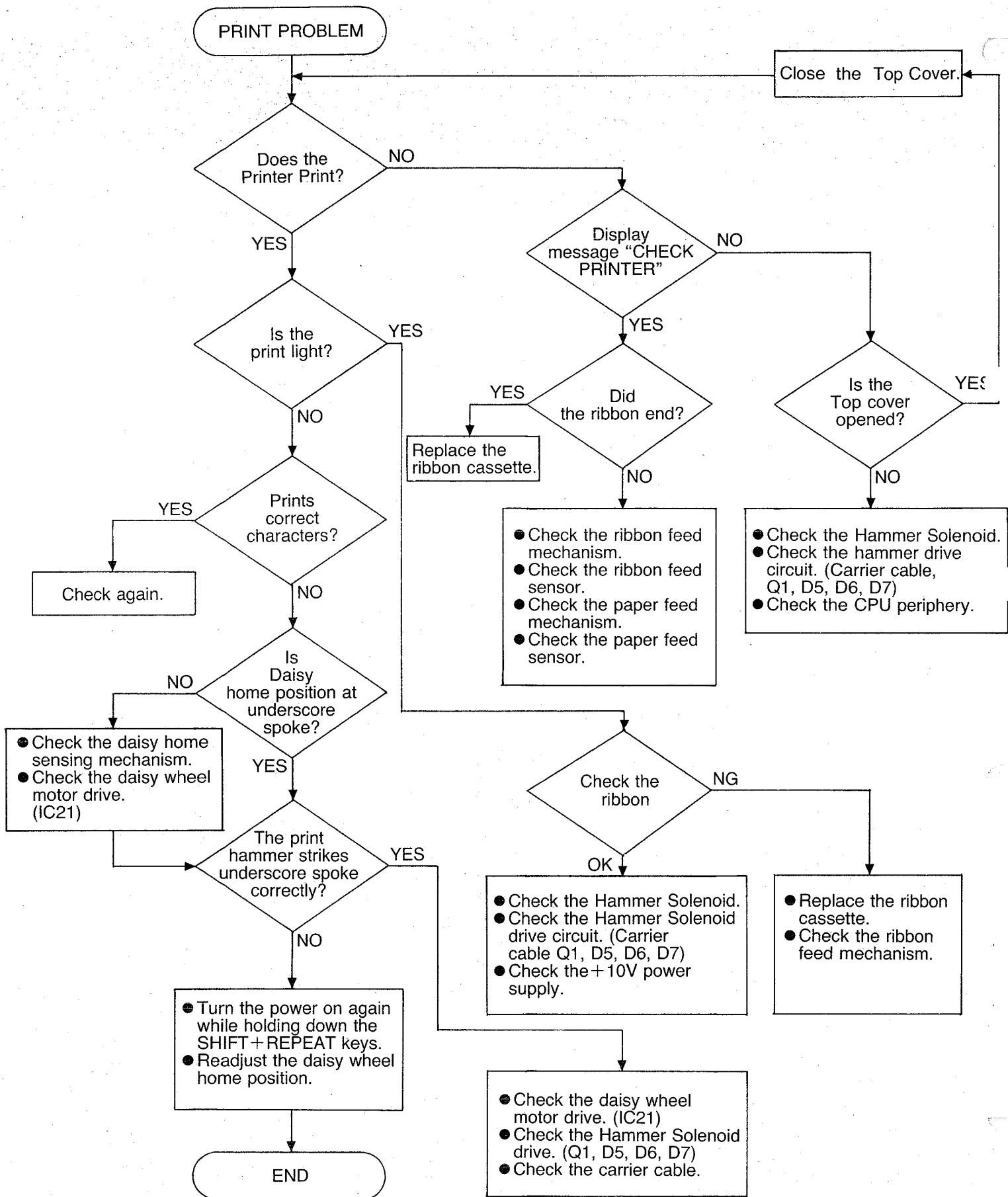
③ Keyboard Problem



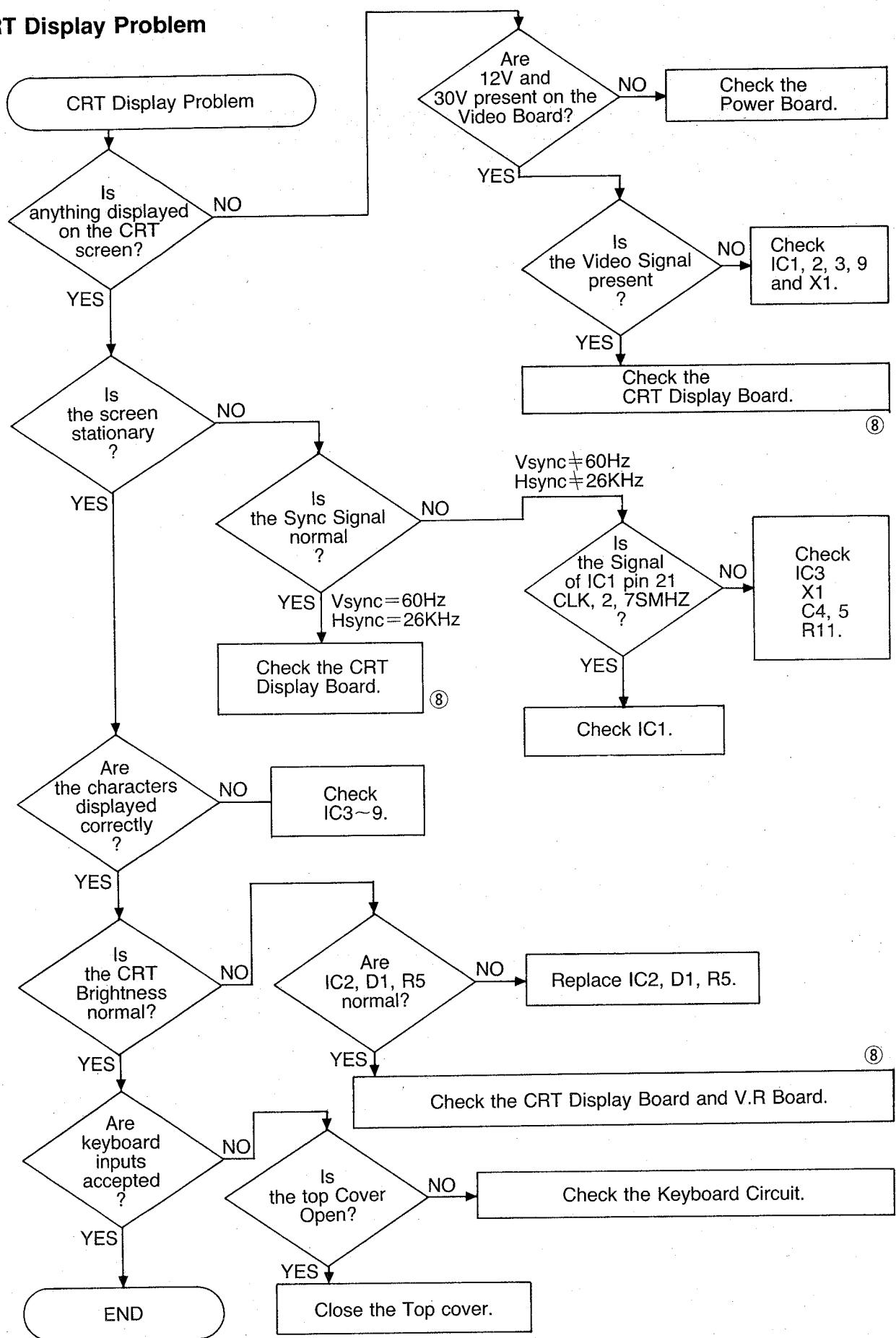
④ Paper Feed System Problem



⑤ Print Problem

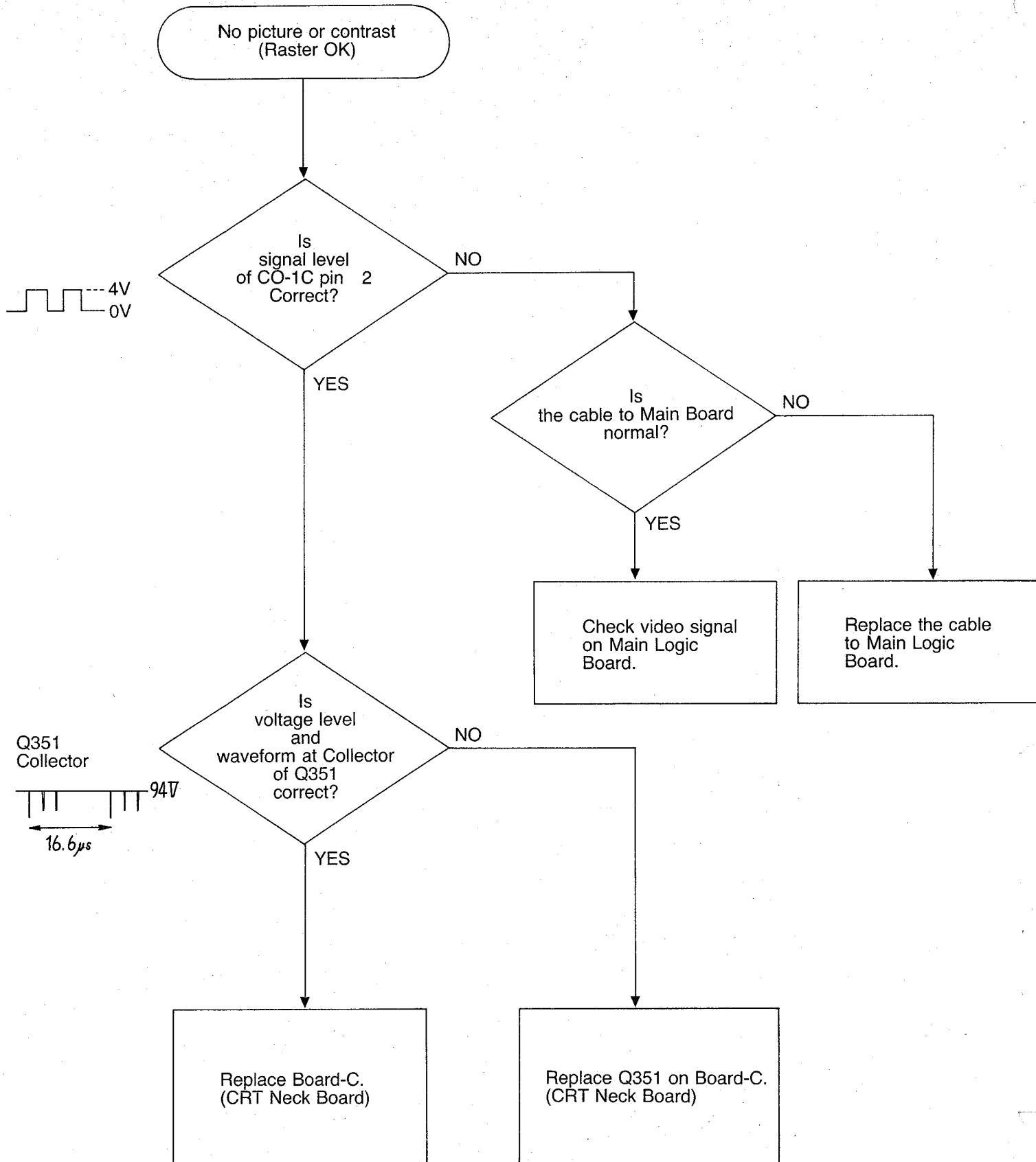


⑥ CRT Display Problem



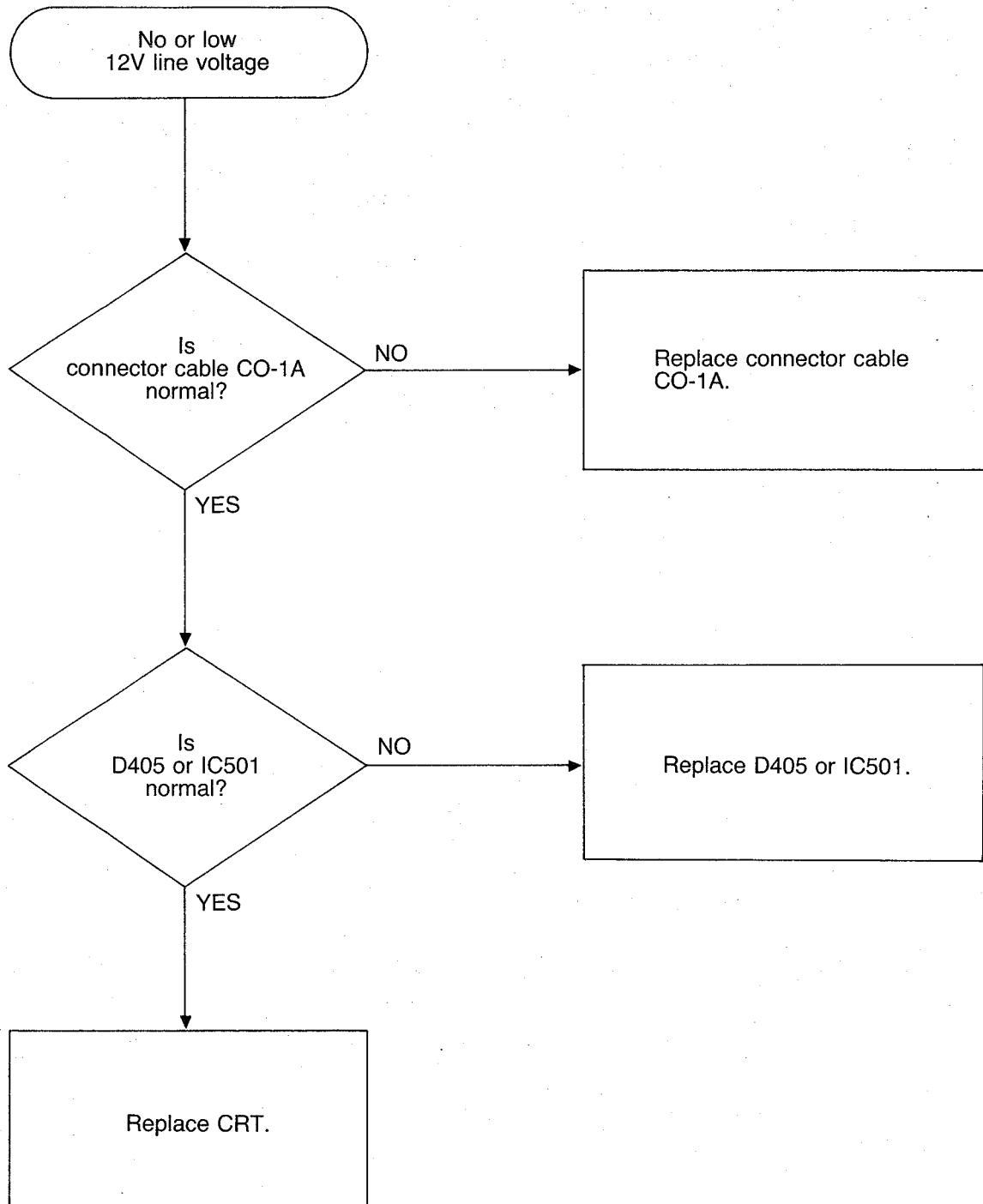
⑧ CRT Display Board Check

a. No Picture or Contrast (Raster OK)

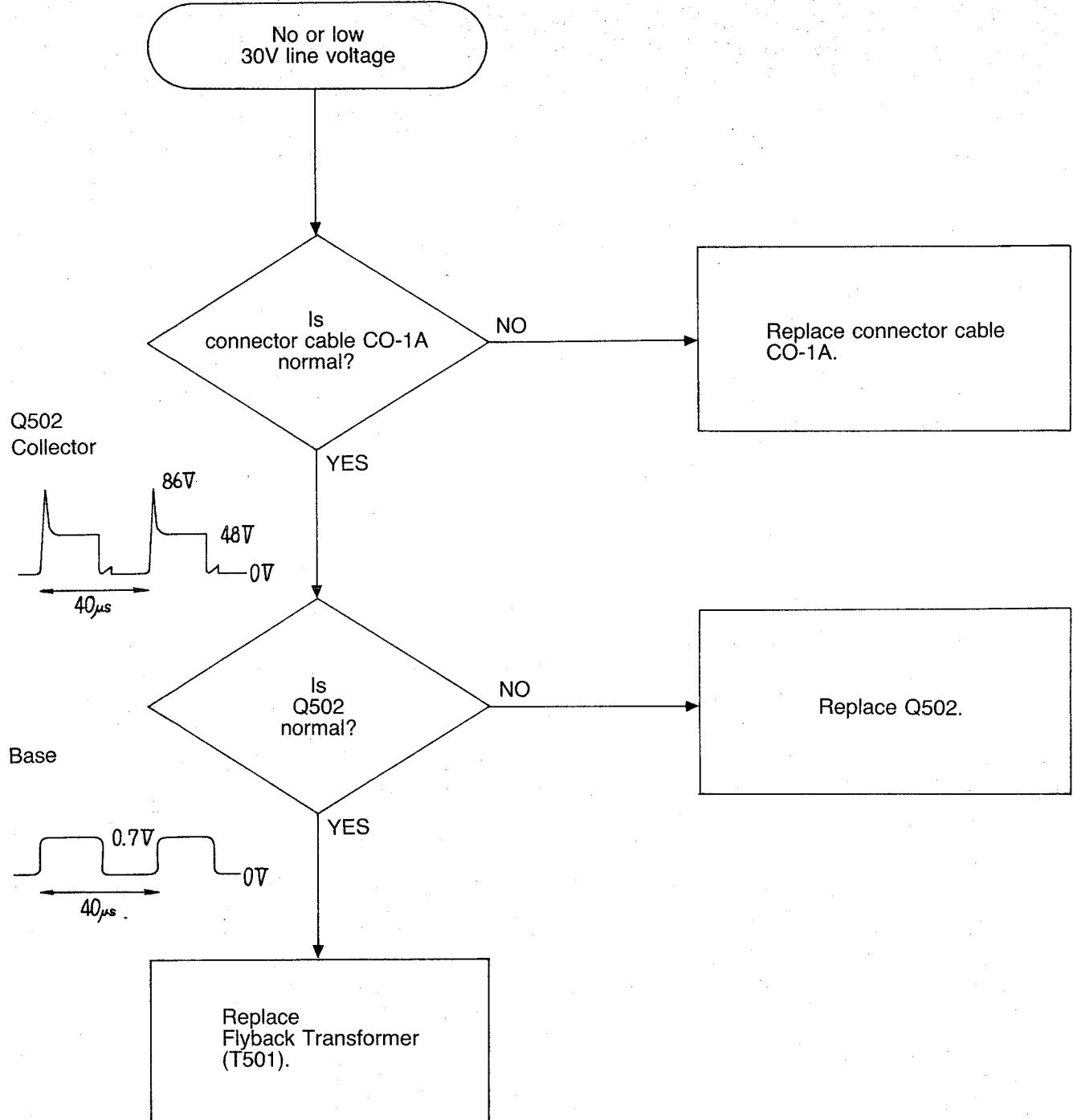


b. No or Low B+Line Voltage

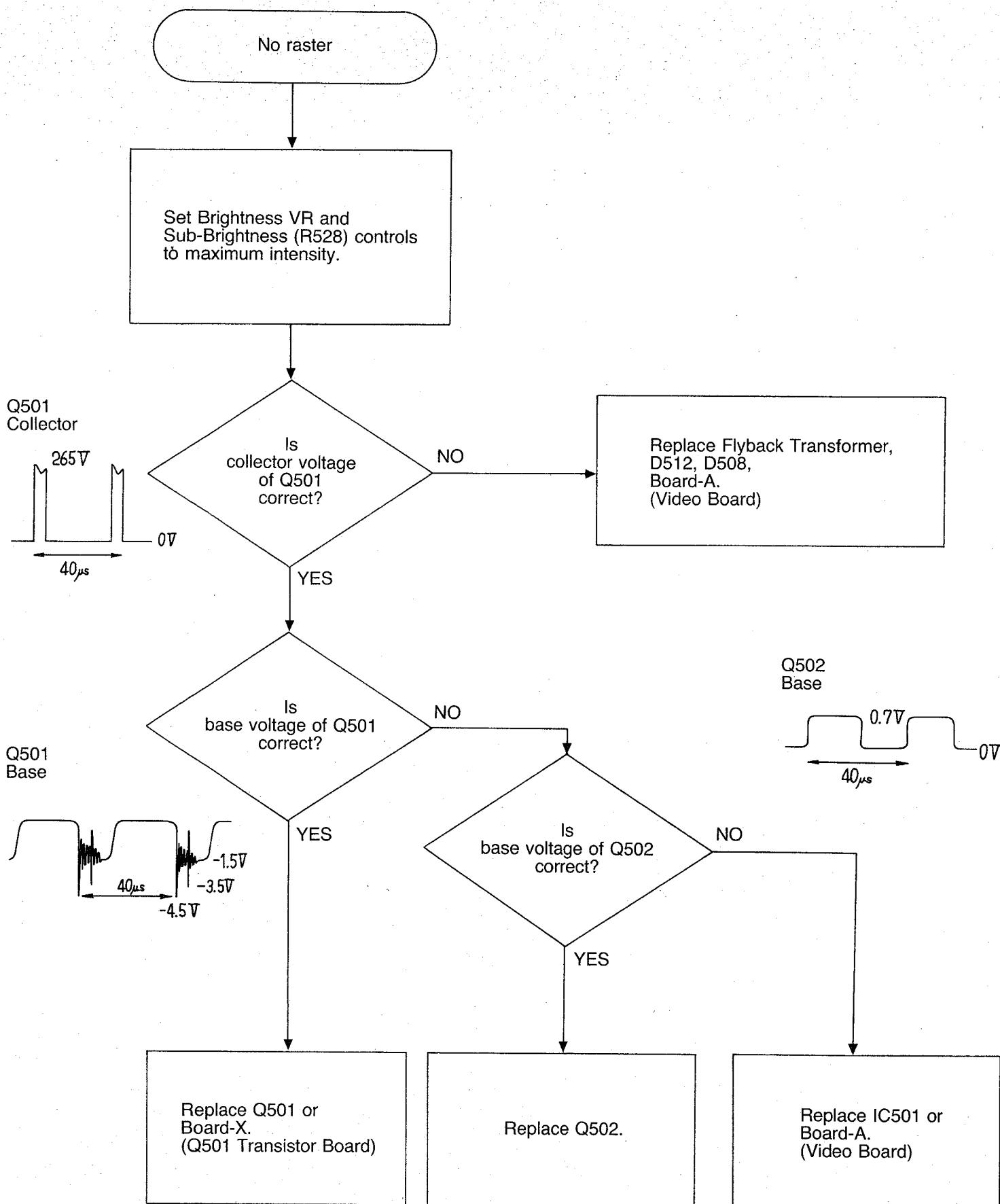
12V Line



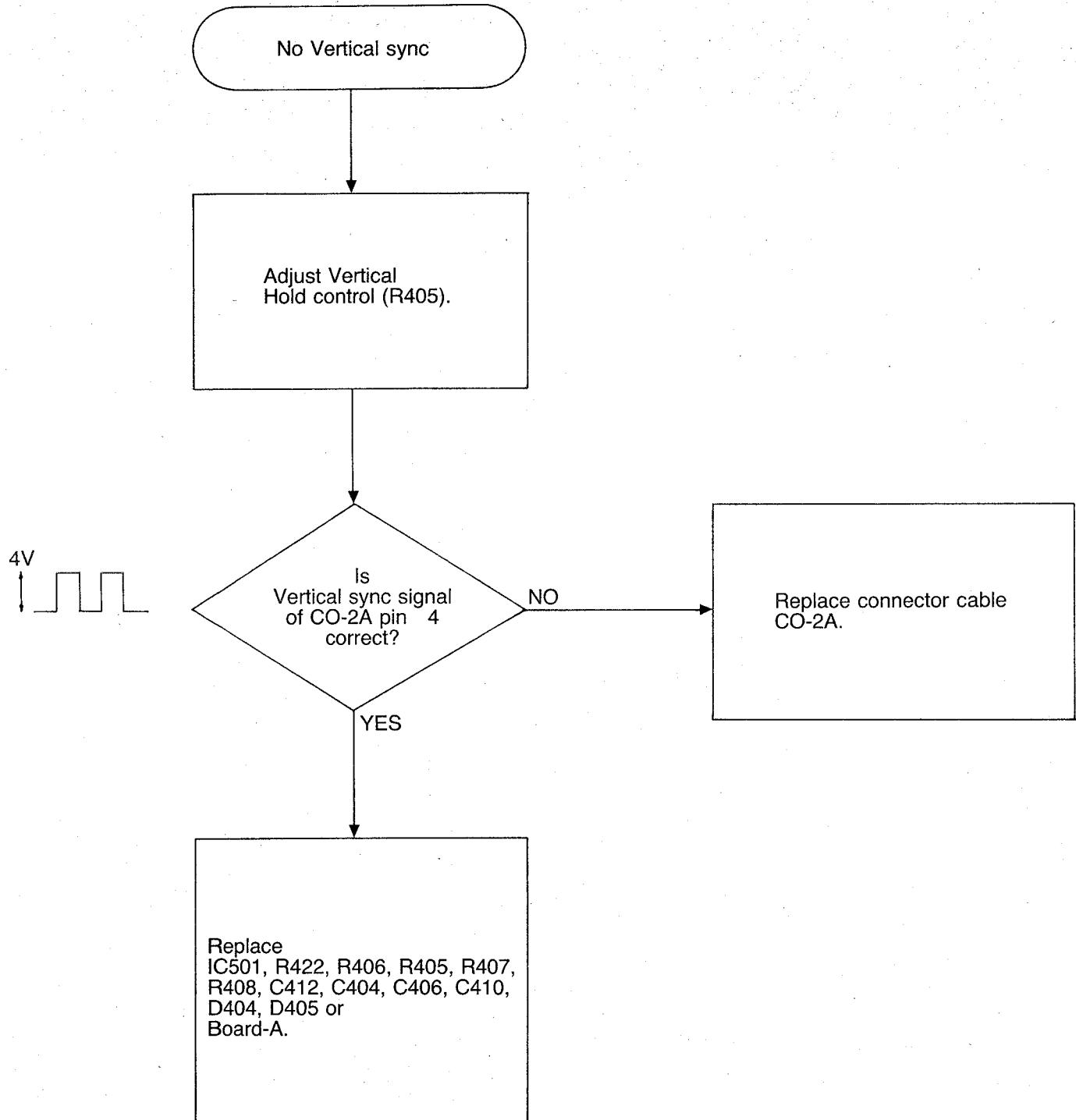
30V Line



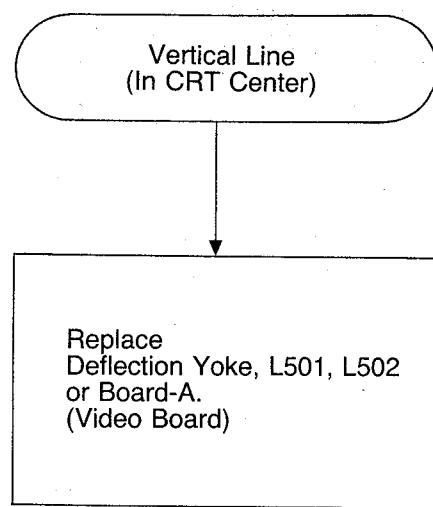
c. No Raster



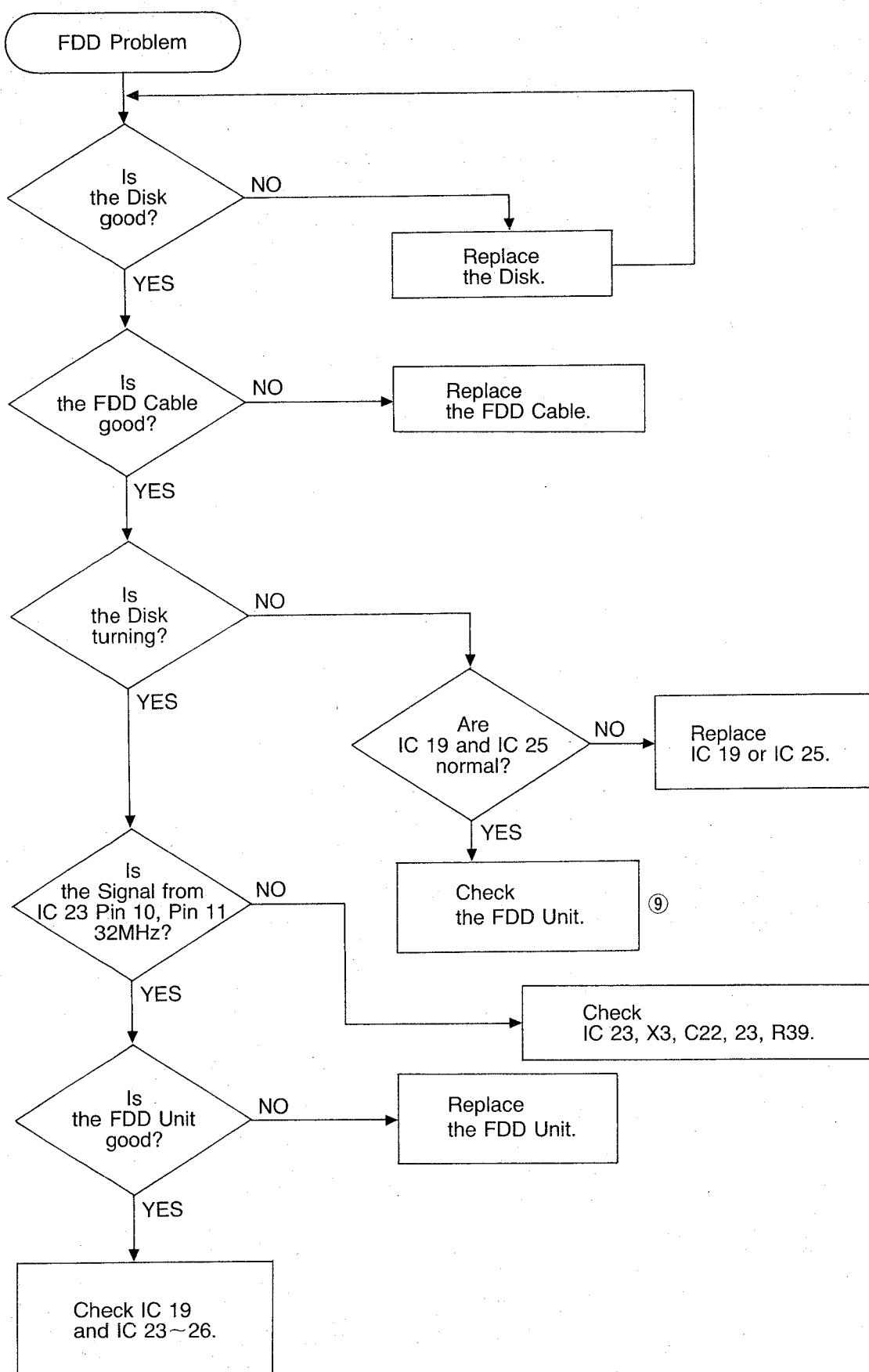
d. No Vertical Sync



e. Vertical Line (In Center of CRT)

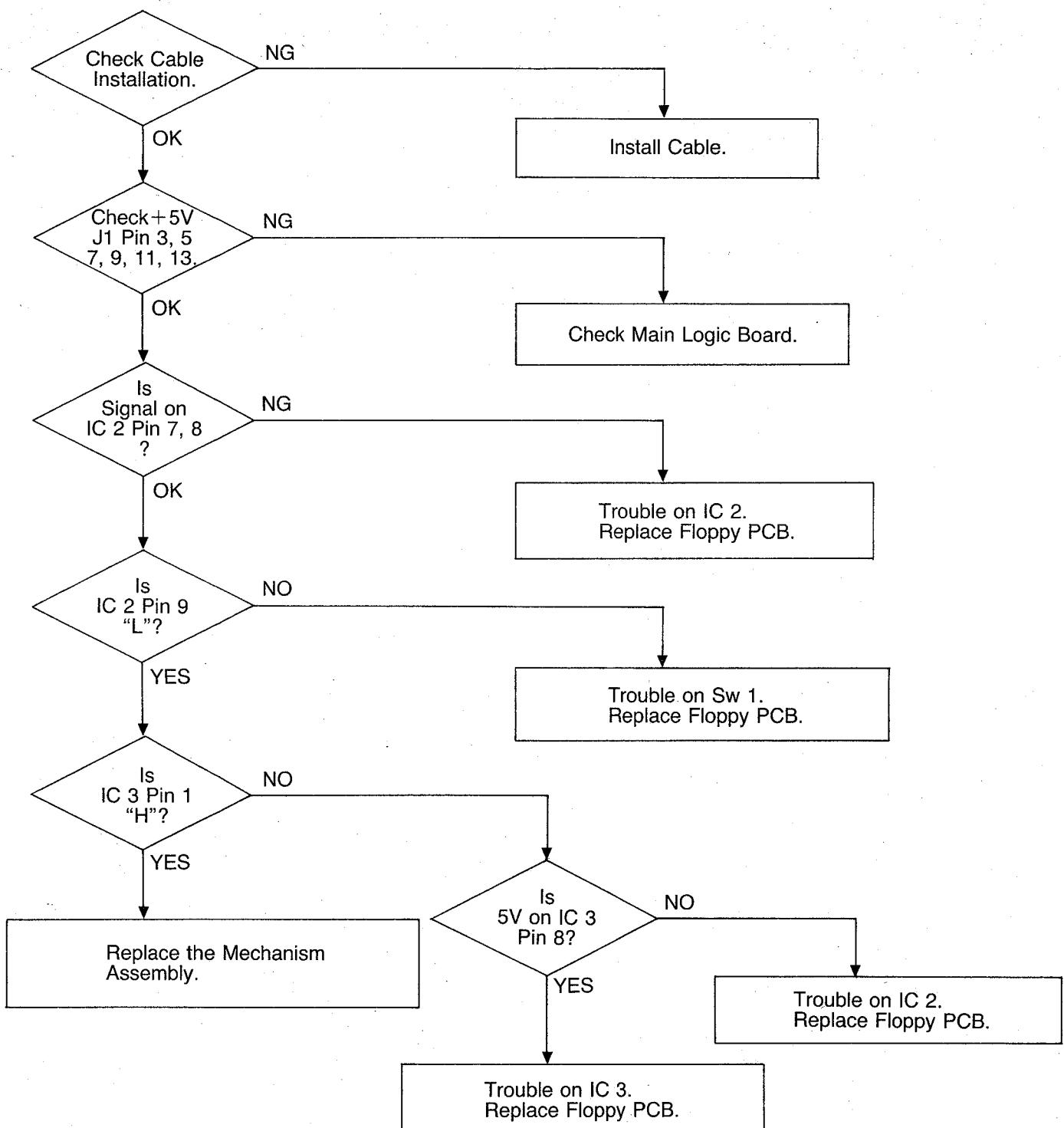


⑦ FDD Problem

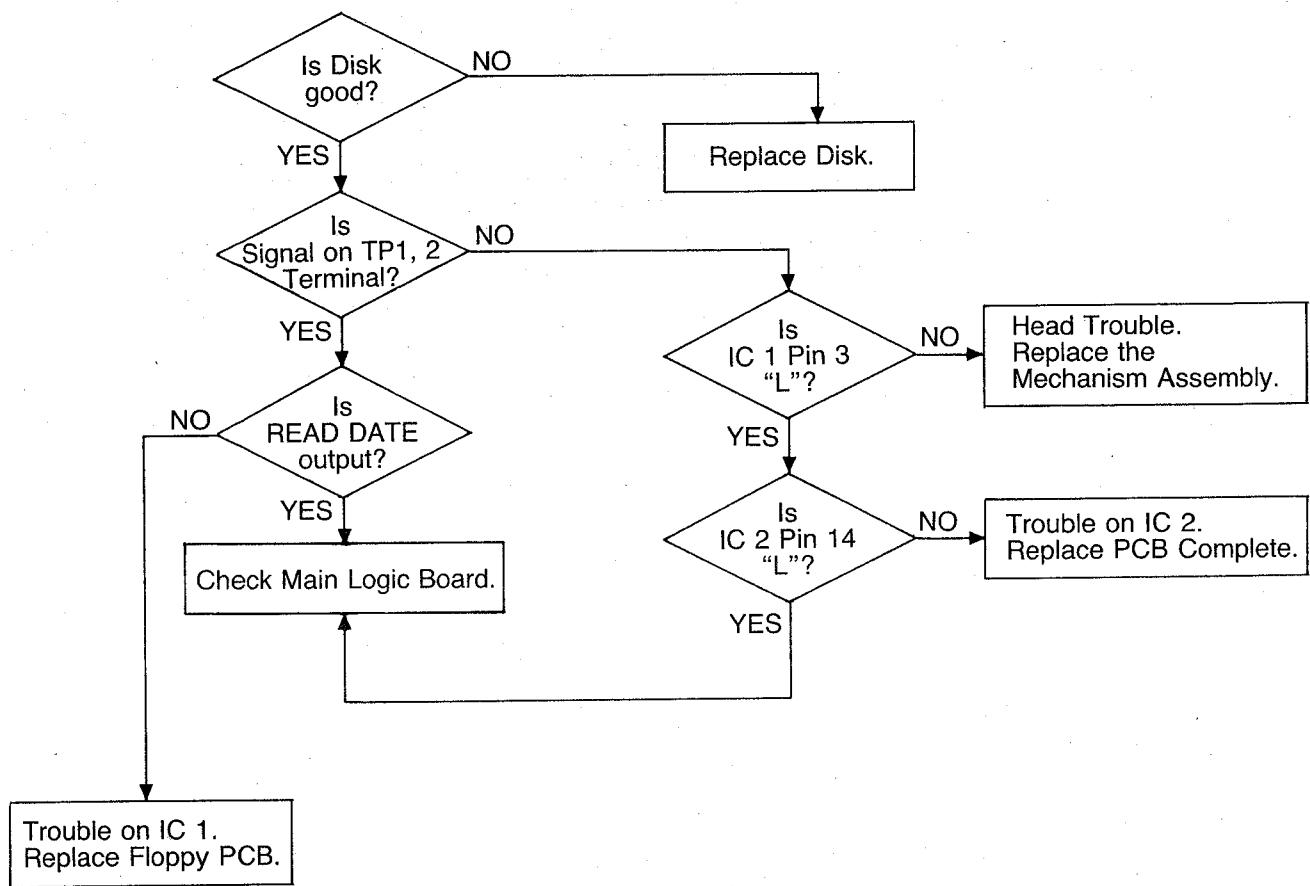


⑨ FDD Unit Check

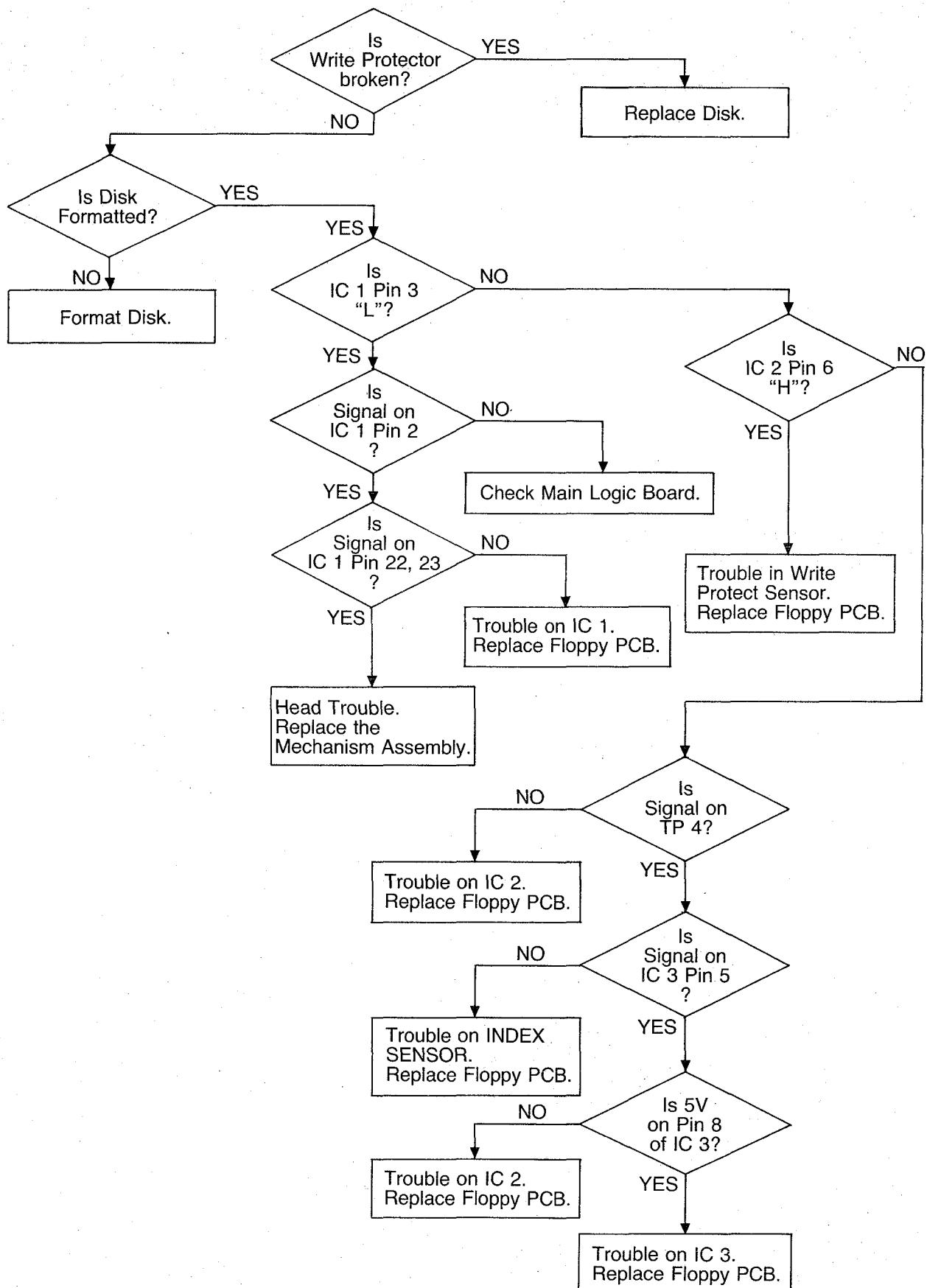
a. Initial Operation Problem



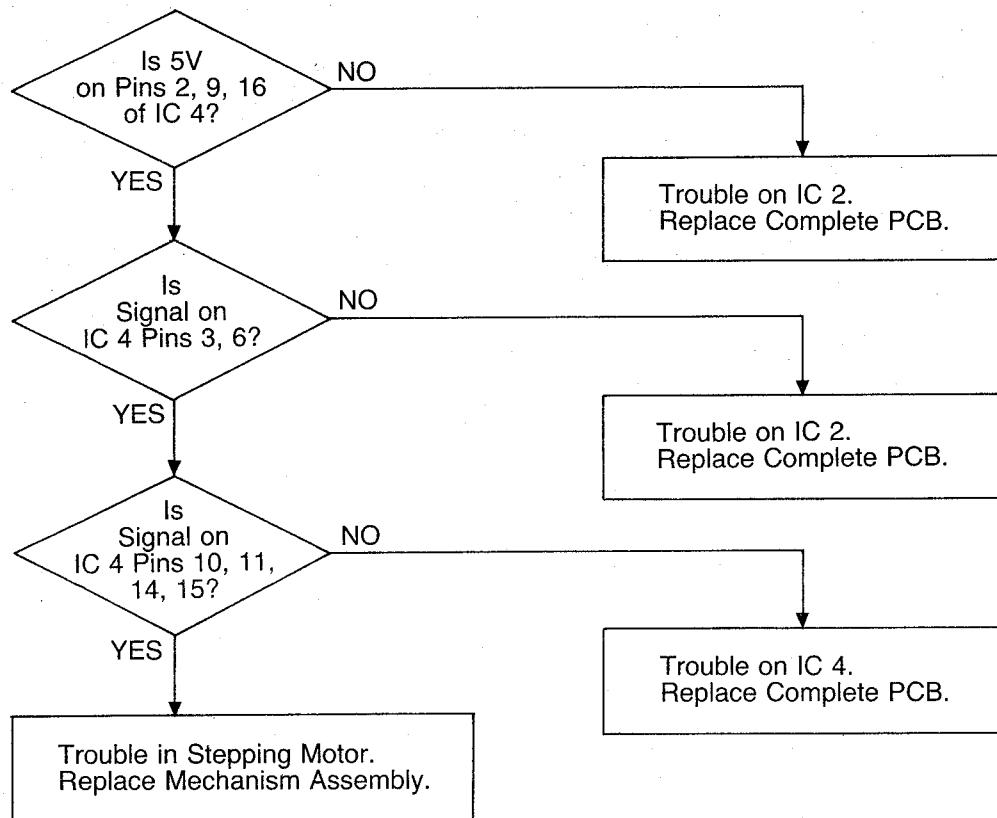
b. Read Problem



c. Write Problem



d. Seek Problem



12. Parts Catalog and Lubrications

NOTES: 1. Important safety notice.

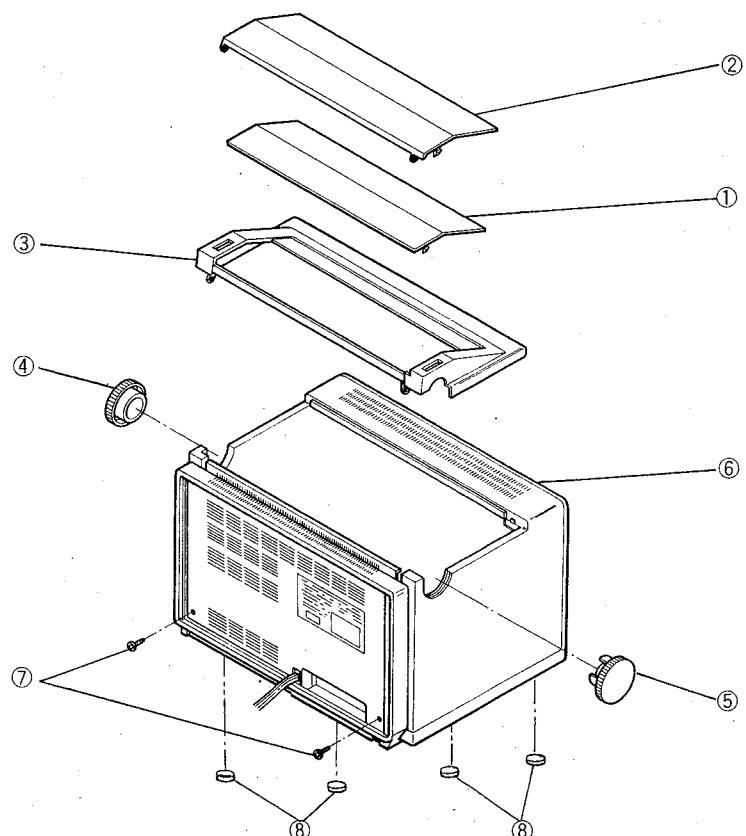
Components identified by \triangle mark have special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

2. The S mark is for service standard parts and may differ from production parts.

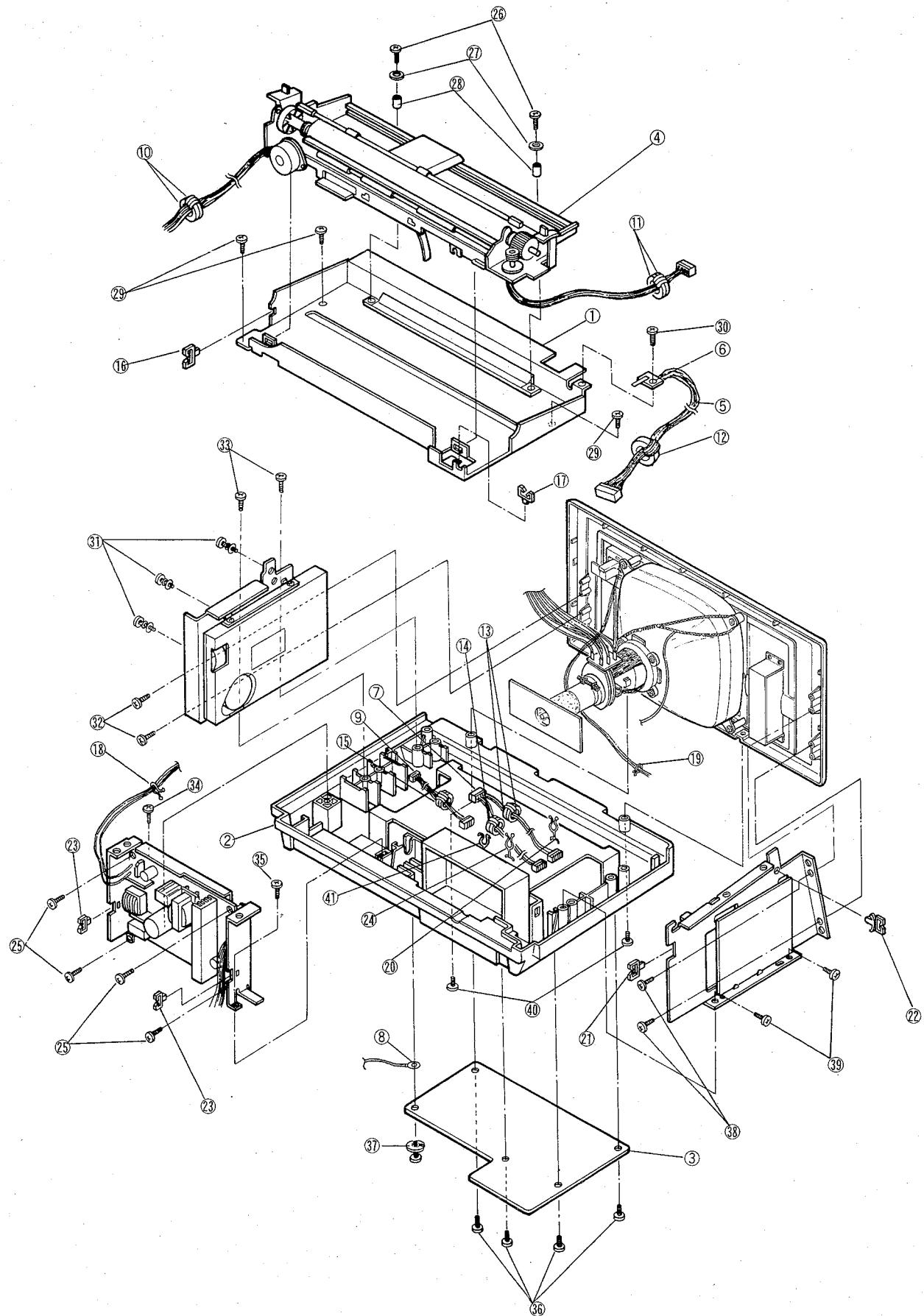
3. The \star mark designates parts available during the production period only.

12.1 Covers



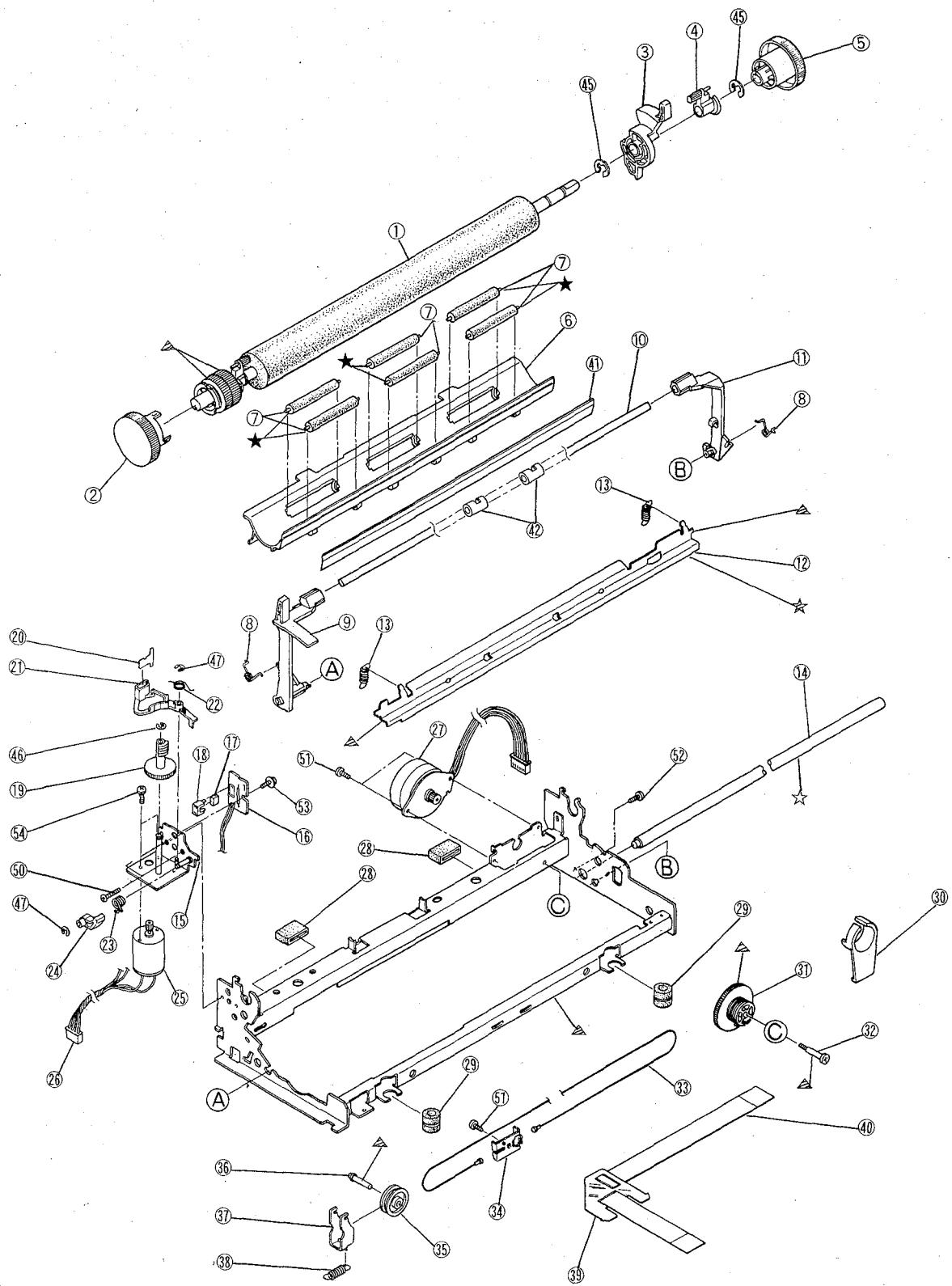
Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAGK3Z	Silent Cover	1	
2	PAKE5Z	Paper Support	1	
3	PAKE4Z	Top Cover	1	
4	PABN3Z	Platen Knob(R)	1	
5	PABN1Z	Platen Knob(L)	1	
6	PAKM18Z	Rear Cover	1	
7	XTW3+12PK	Rear Cover Screw	2	
8	PJHG327Z	Rubber Plate	4	

12.2 Chassis Construction



Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAUC3Z	Mechanical Plate	1	
2	PAKM19Z	Base	1	
3	PAKU1Z	Access Cover	1	
4	PJZEW1500PA	Printing Mechanism	1	
5	PAXAJT07W150	Lid Switch Lead	1	
6	PAWSMSW1465C	Lid Switch	1	
7	PAXAJT04W150	CPU-Video Lead	1	
8	PAXAJE02W150	GND Lead	1	
9	PAXAJT05W150	Modular Jack Lead	1	
10	PALEL6T16812	Ferrite Core	2	
11	PALEL6T16812	Ferrite Core	2	
12	RALEL6T16812	Ferrite Core	1	
13	PALEL6T16812	Ferrite Core	2	
14	PALEL6T16812	Ferrite Core	1	
15	PJJN8ZA-C	Ferrite Core	1	
16	TMM13421	Cord Clamper	1	
17	TMM13421	Cord Clamper	1	
18	TMM7468	Cord Clamper	1	
19	TMM6463	Cord Clamper	1	
20	TMM6428-1	Cord Clamper	3	
21	TMM13421	Cord Clamper	1	
22	TMM76416	Cord Clamper	1	
23	TMM13421	Cord Clamper	2	
24	TMM16452	Cord Clamper	1	
25	XTV3+8F	Power Board Screw	4	
26	XTW3+16L	Printer Set Screw	2	
27	XWG3F13	Washer	2	
28	PAUC8Z	Mount Spacer	2	
29	XTV3+8F	Mechanical Plate Screw	3	
30	XTV3+8F	Lid Switch Screw	1	
31	XYN3+F6	FDD Screw	3	
32	XTV3+12G	FDD Frame Screw	2	
33	XTV3+12G	FDD Frame Screw	2	
34	XTV3+12G	Power Board Screw	1	
35	XTV3+12G	Power Board Screw	1	
36	XTN3+8G	Access Cover Screw	4	
37	XYC3+CJ10	Screw with Washer	1	
38	XTV3+12G	Video Frame Screw	2	
39	XTV3+12G	Video Frame Screw	2	
40	XTB4+15A	Front Cover Screw	2	
41	TMM7473	Cord Clamper	1	

12.3 Mechanical Chassis and Platen



=Lubrication=

▲PJOL-G311S(Grease)

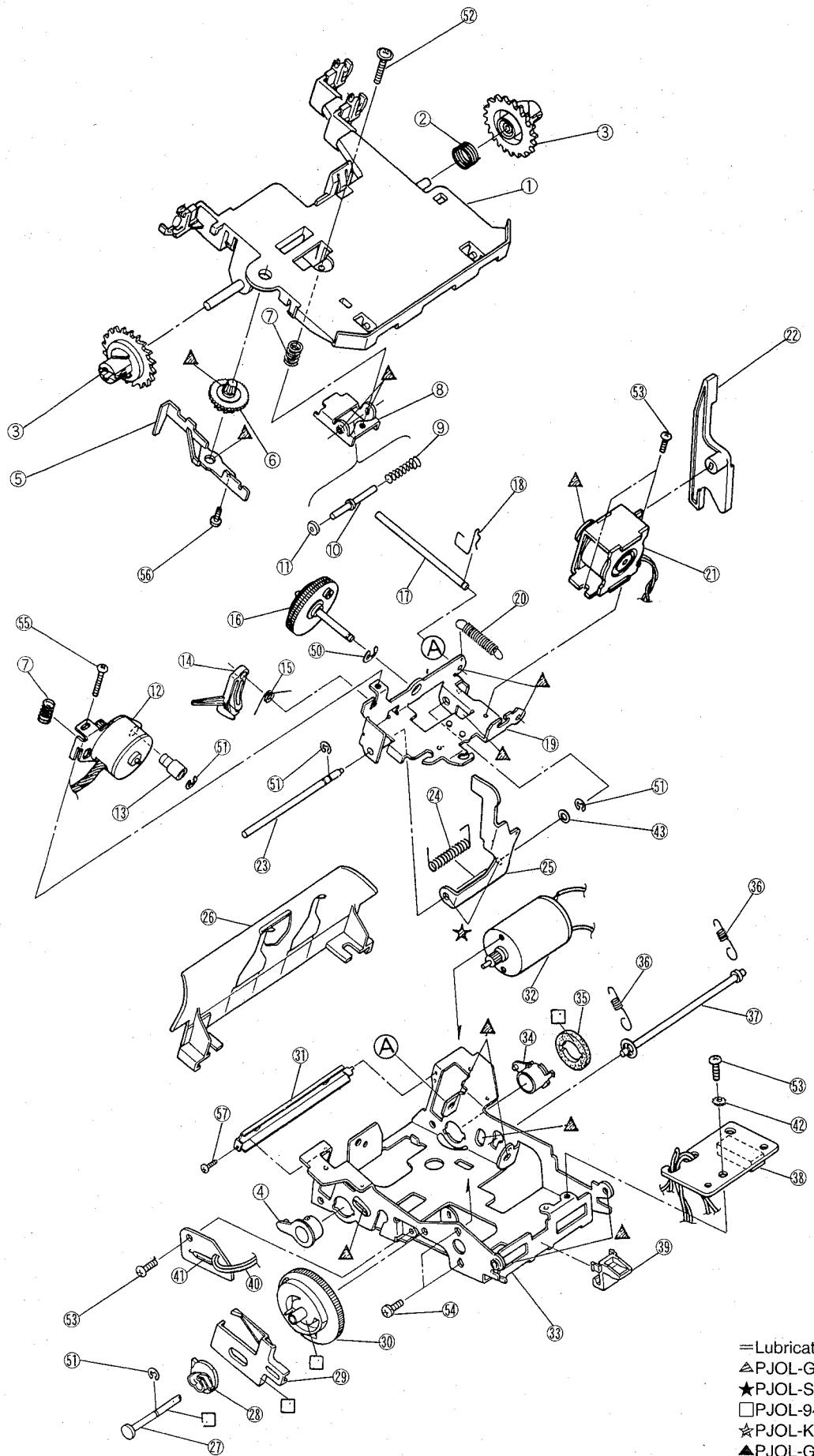
☆PJOL-G948P(Oil)

☆PJOL-K1879(Grease)

★PJOL-SG3451(Grease)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PJZXR340M	Platen Assembly	1	
2	PABN1Z	Platen Knob (L)	1	
3	PJUB63Z	Paper Release Lever	1	
4	PJDJ08261RZ	Platen Bushing (R)	1	
5	PABN3Z	Platen Knob (R)	1	
6	PJZH1XR310M	Paper Pan Assembly	1	
7	PJDR37Z	Feed Roller	6	
8	PJDS7018Z	Spring. Bail Lever	2	
9	PJUB62Z	Bail Lever (L)	1	
10	PJDF955Z	Bail Shaft	1	
11	PJUB61Z	Bail Lever (R)	1	
12	PJUL77Z	Paper Release Plate	1	
13	PJDS5108Z	Spring. Paper Release	2	
14	PJDF552Z	Carrier Shaft	1	
15	PJZHXR340M	Paper Feed Motor Bracket Assembly	1	
16	PJVSFR1Z	Reed Switch (SW502)	1	
17	PJHE028Z	Magnet	1	
18	PJHR9109Z	Magnet Holder	1	
19	PJDG5023Z	Paper Feed Gear	1	
20	PJMC68Z	Magnet Shutter	1	
21	PJHR549Z	Home Detecting Lever	1	
22	PJDS7016Z	Spring. Home Detecting Lever	1	
23	PJDS7015Z	Spring. Detent	1	
24	PJDE91Z	Detent. Lever	1	
25	PJWQ3XR340M	Paper Feed Motor Assembly	1	
26	PJJS437Z	Paper Feed Motor Lead	1	
27	PJJQ84Z	Carrier Spacing Motor	1	
28	PJHG947Z	Mount Rubber. Rear	2	
29	PJHG932Z	Mount Rubber. Front	2	
30	PJZXR250M	Gear Cup (Jig)	1	
31	PJDD3191Z	Drum Gear	1	
32	PJHE5040Z	Drum Gear Shaft	1	
33	PJDZ25Z	Carrier Cable	1	
34	PJUL78Z	Cable Hanger	1	
35	PJDR35Z	Tension Pulley	1	
36	PJDY137Z	Tension Pulley Shaft	1	
37	PJUL76Z	Tension Arm	1	
38	PJDS5164Z	Tension Spring	1	
39	PJHR551Z	Cable Holder	1	
40	PAUP1Z	Flat Cable	1	
41	PJHR533Z	Guide. Paper Feed	1	
42	PJZR2XR250M	Bail Roller Kit	2	
45	XUC7FY	E-ring	2	
46	XUC3FY	E-ring	1	
47	XUC2FY	E-ring	2	
50	XTN3+12F	Screw 3×12mm	2	
51	XTN3+6F	Screw 3×6mm	3	
52	XTW3+U6L	Screw 3×6mm	1	
53	XTW3+5L	Screw 3×5mm	1	
54	XYN3+C4	Screw 3×4mm	2	

12.4 Carrier

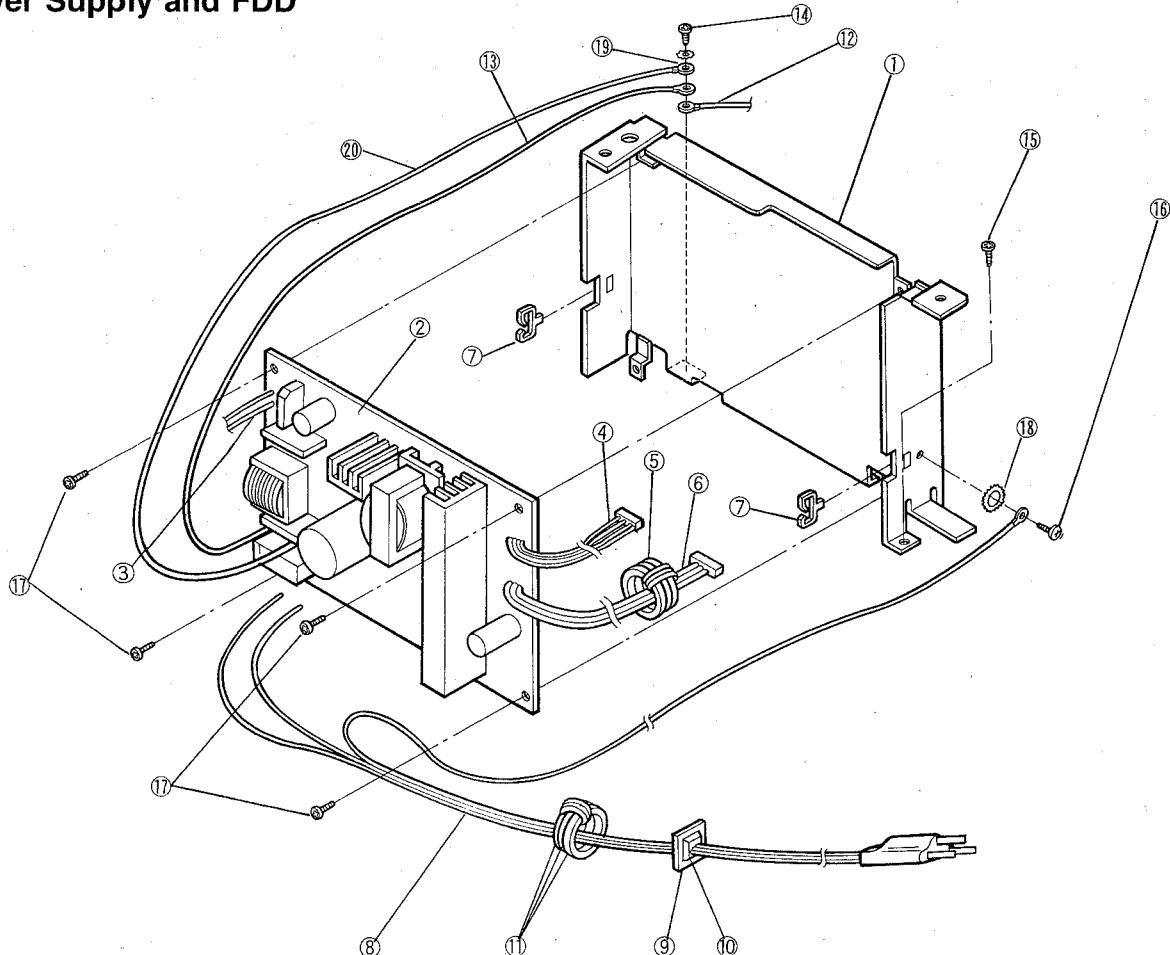


≡ Lubrication ≡

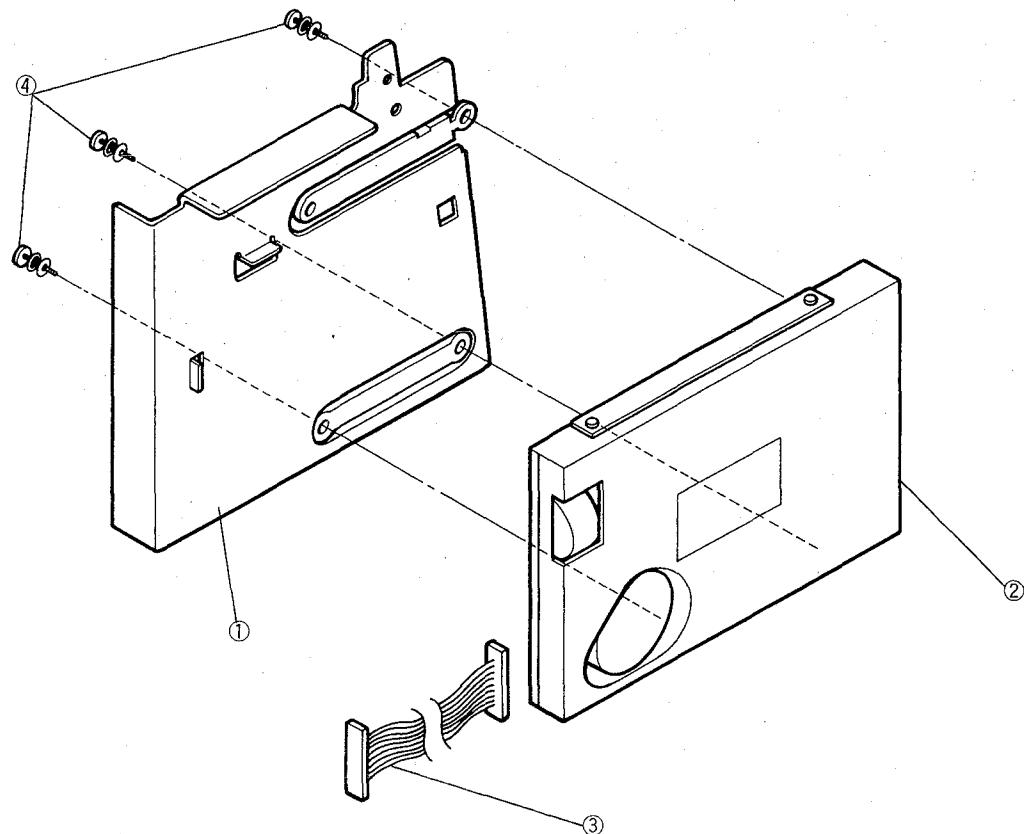
- Lubrication —
- △ PJOL-G311S (Grease)
- ★ PJOL-SG3451 (Grease)
- PJOL-948P (Oil)
- ★ PJOL-K1879 (Grease)
- ▲ PJOL-GNMG (Grease)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PJMU50Y	Ribbon Holder	1	
2	PJDS7005Z	Reel Tension Spring	1	
3	PJDG5071Z	Correct Reel Gear	2	
4	PJDJ08271RZ	Bushing. Carrier (L)	1	
5	PJHR548Z	Stop Pawl. Tape Feed	1	
6	PJDG5637X	Ribbon Feed Gear	1	
7	PJDS5107Z	Spring. Adjust	2	
8	PJMD2012Z	Holder, Cam Follower	1	
9	PJDS3150Z	Spring, Cam Follower	1	
10	PJDY135Z	Cam Follower	1	
11	PJHG711Z	Rubber, Cam Follower	1	
12	PJWQ1XR340M	Daisywheel Motor Assembly	1	
13	PJDJ03051FZ	Wheel Shaft Bushing	1	
14	PJHR9103Z	Latch Lever	1	
15	PJDS7019Z	Initialize Lever Spring	1	
16	PJZG1XR340M	Daisywheel Gear Assembly	1	
17	PJDF553Z	Slide Shaft. Carrier	1	
18	PJDS9076Z	Clip	1	
19	PJMU48Z	Sub Carrier Frame	1	
20	PJDS4200Y	Spring	1	
21	PJFP28Z	Hammer Solenoid	1	
22	PJBD17Z	Daisywheel Release Lever	1	
23	PJDY132X	Hammer Shaft	1	
24	PJDS7008Y	Spring. Hammer	1	
25	PJDE92Z	Hammer	1	
26	PJZCXR340M	Card Holder Assembly	1	
27	PJDY134Z	Shaft. Cam Gear	1	
28	PJHR9110Z	Feed Pawl, Ribbon	1	
29	PJHR9017Y	Slider. Feed Pawl	1	
30	PJZG2XR340M	Cam Assembly	1	
31	PJMU51Z	Front Support	1	
32	PJWQ2XR340M	Ribbon Feed Motor Assembly	1	
33	PJMU49Y	Carrier Frame	1	
34	PJDJ08251RZ	Bushing. Carrier (R)	1	
35	PJHS951Z	Oil Felt	1	
36	PJDS4042Z	Spring, Lock Lever	2	
37	PJZFXR340M	Lock Bar Assembly	1	
38	PJJS430Z	Carrier Connector (CN500)	1	
39	PJHR9102Z	Rear Slider	1	
40	PJJE68Z	Sensor Lead	1	
41	PJVSFR1Z	Reed Switch (SW501)	1	
42	XWC3B	Washer	1	
43	PJNW310Z	Plastic Washer	1	
50	XUCR4FY	E-ring	1	
51	XUC2FY	E-ring	4	
52	XTW3+12L	Screw 3×12mm	1	
53	XTN3+6F	Screw 3×6mm	4	
54	XYN3+C4	Screw 3×4mm	2	
55	XTN26+12F	Screw 2.6×12mm	1	
56	XTN26+8G	Screw 2.6×8mm	1	
57	XTN2+4F	Screw 2×4mm	1	

12.5 Power Supply and FDD

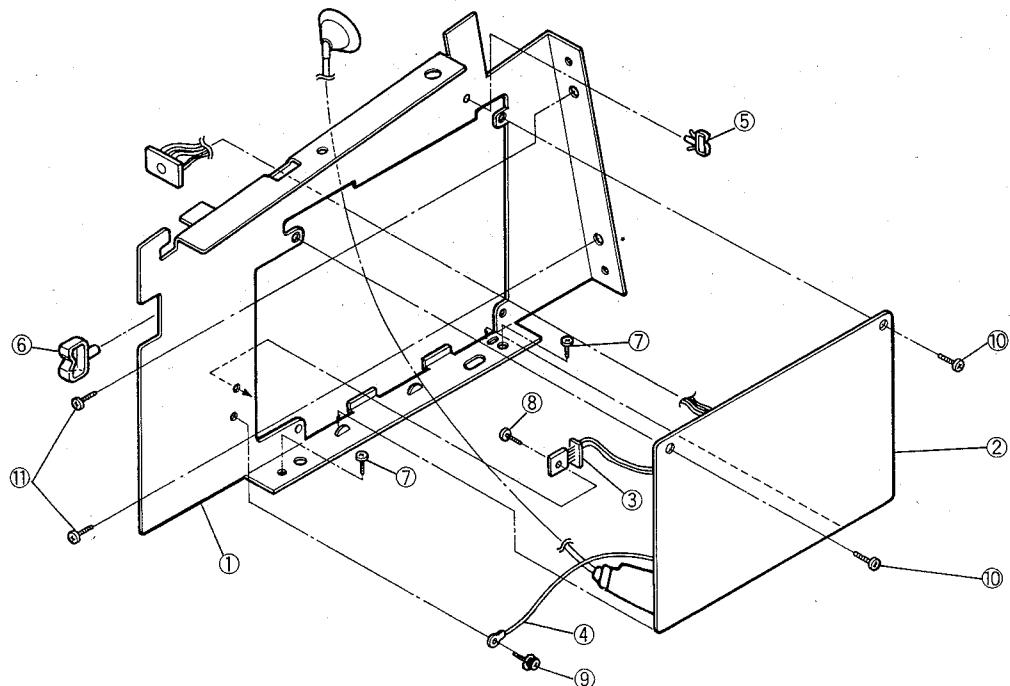


Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAUC6Z	Power Board Frame	1	
2	PAWP2007ZA	Power PCB Complete	1	
3	PAXAJT09W150	AC Switch Lead	1	
4	PAXAJT06W150	Power-CPU Lead	1	
5	PALEL6T16812	Ferrite Core	1	
6	PAXAJT02W150	Power-Video Lead	1	
7	TMM13421	Cord Clamper	2	
8	PJJA68Z	Power Cord	1	
9	PJMD9014Z	Cord Bush Plate	1	
10	PQHR104Z	Cord Bush	1	
11	PJJN8ZA-C	Ferrite Core	3	
12	PAXAJE02W150	GND Lead	1	
13	PAXAJE01W150	GND Lead (K)	1	
14	XTV3+12G	Power Frame Screw	1	
15	XTV3+12G	Power Frame Screw	1	
16	XTV3+8F	Frame GND Screw	1	
17	XTV3+8F	Power Board Screw	4	
18	XWC3FX	Washer	1	
19	XWC3FX	Washer	1	
20	PAXAJE01K101	GND Lead	1	⚠

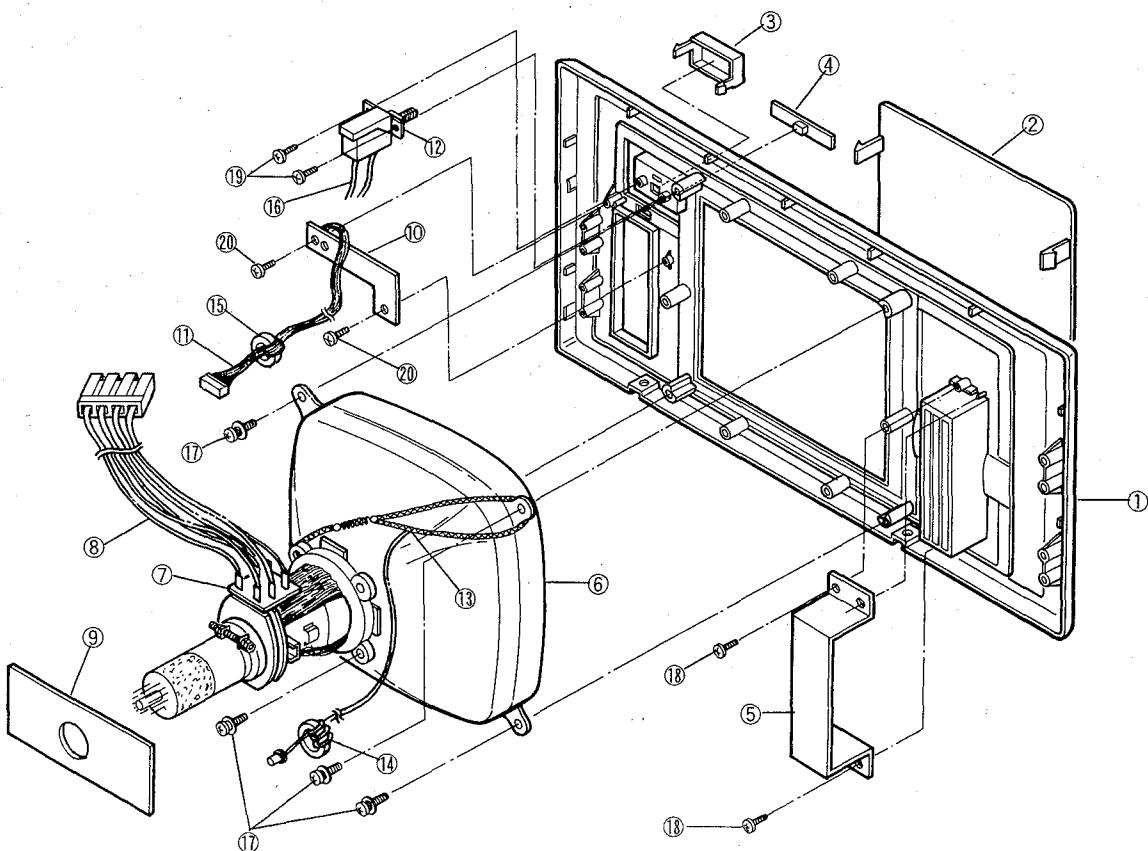


Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAUC5Z	FDD Frame	1	
2	PAJDEME112L	FDD	1	
3	PAXAJT08W150	FDD Lead	1	
4	XYN3+F6	FDD Screw	3	

12.6 Video and CRT

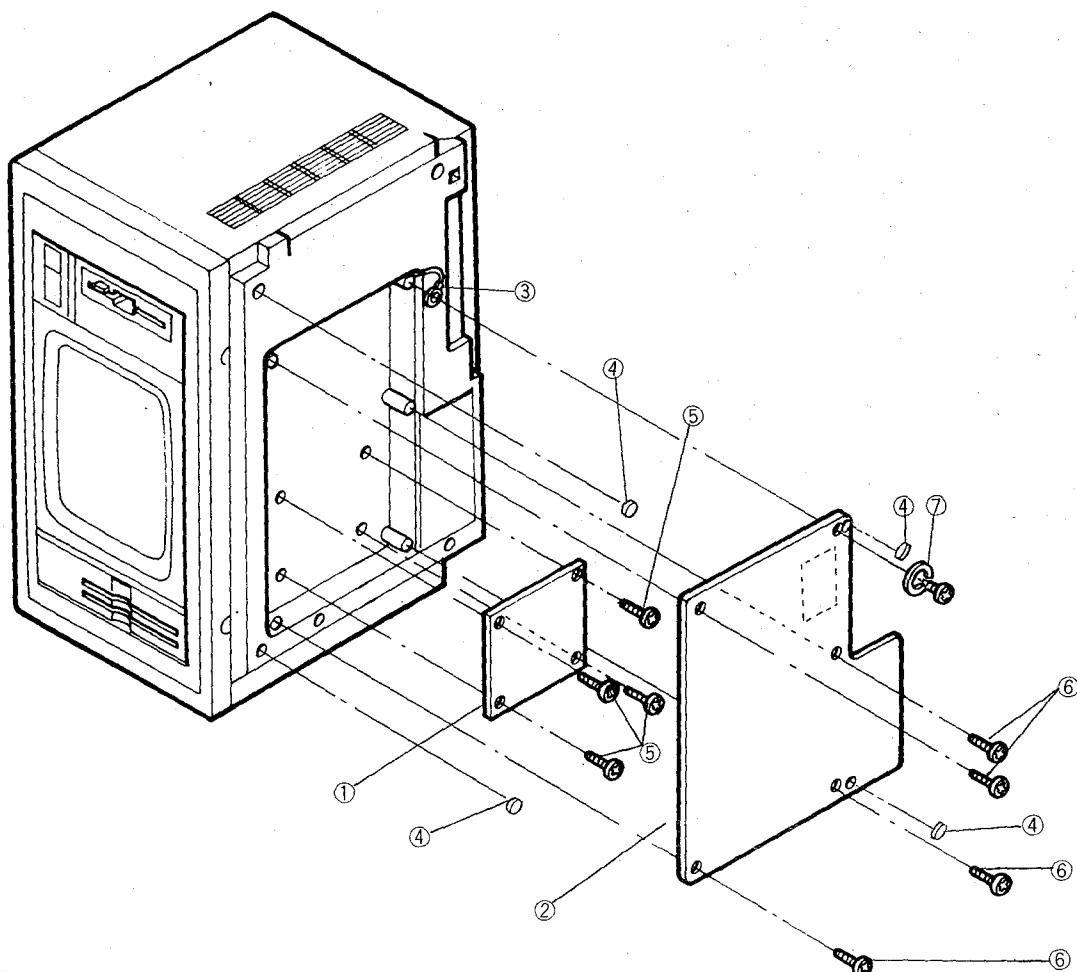


Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAUC4Z	Video Board Frame	1	
2	PANP30912AB	Video-A PCB Complete	1	
3	PANP31723ZA	Video-X PCB Complete	1	
4	PAXAJE01K101	1P GND Lead (A10)	1	
5	TMM76416	Lead Clamper	1	
6	TMM13421	Lead Clamper	1	
7	XTV3+12G	Video Frame Screw	2	
8	XTV3+8F	Transistor Screw	1	
9	XYE3+BE8	GND Lead Screw	1	
10	XTV3+8F	Video Board Screw	2	
11	XTV3+12G	Video Frame Screw	2	



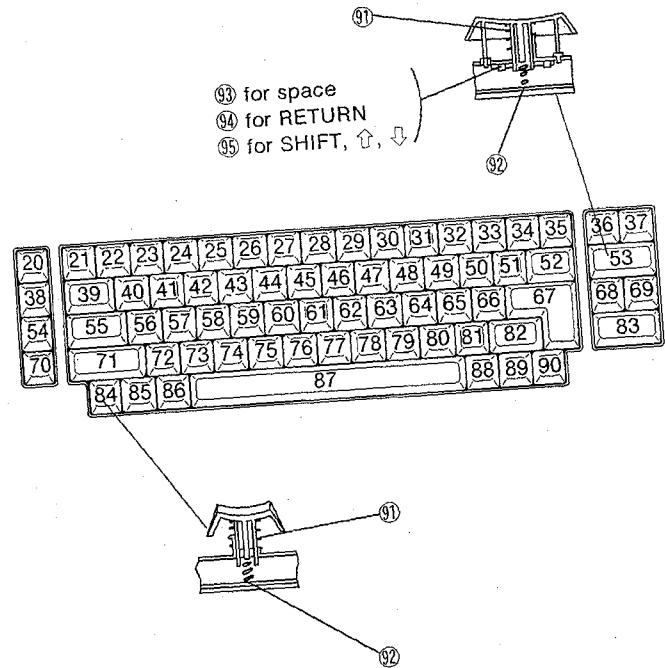
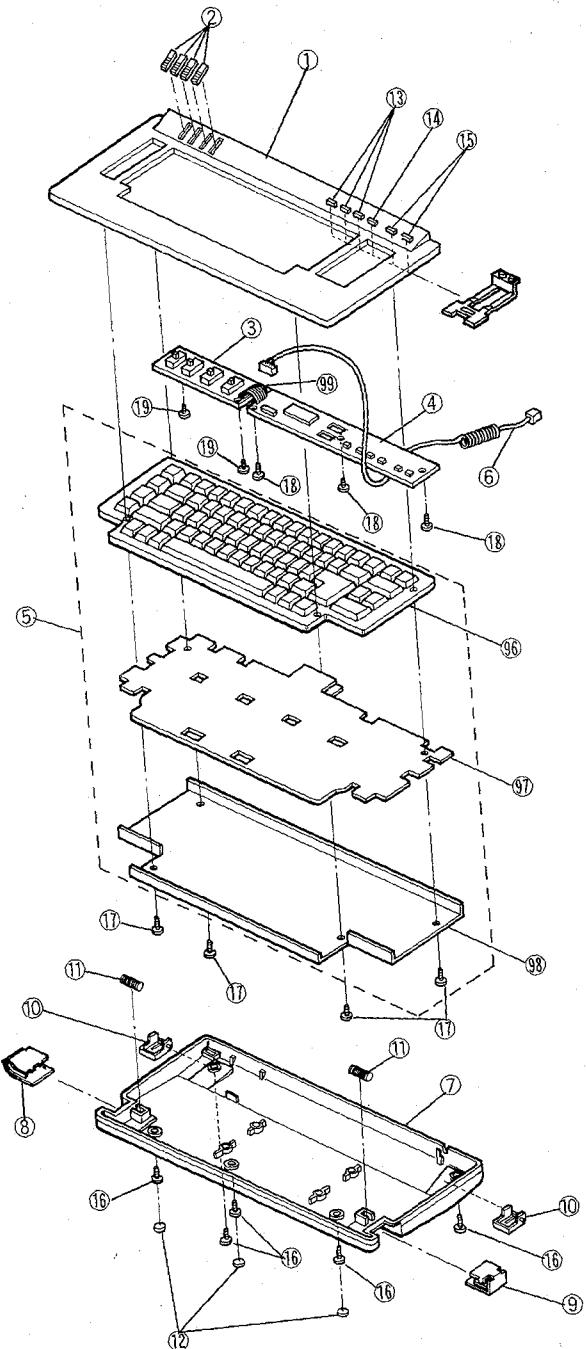
Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAKM17Z	Front Cover	1	
2	PAGK4Z	CRT Cover	1	
3	PABC26Z	Power Switch Button	1	
4	PABC27Z	Brightness Key	1	
5	PAKE8Z	Disk Storage	1	
6	230BTB40HBN	CRT	1	
7	PALY30309D	DY	1	
8	PAXAJT01W150	DY Lead	1	⚠
9	PANP31411AB	Video-C PCB Complete	1	
10	PAWP2010ZA	Brightness PCB Complete	1	
11	PAXAJT03W150	Brightness-Video Lead	1	
12	ESB8274V	Power Switch	1	
13	PAXF3A01W150	CRT GND Lead	1	
14	PALEL6T16812	Ferrite Core	1	
15	PALEL6T16812	Ferrite Core	1	
16	PAXAJT09W150	AC Switch Lead	1	
17	XYAT961	CRT Screw	4	
18	XTV3+10G	Disk Storage Screw	2	
19	XTV3+10G	Power Switch Screw	2	
20	XTV3+10G	Brightness PCB Screw	2	

12.7 Base



Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAWP2006ZA	Main Logic Board Complete	1	
2	PAKU1Z	Access Cover	1	
3	PAXAJE02W150	GND Lead	1	
4	PJHG327Z	Rubber Plate	4	
5	XTV3+8G	Main Logic PCB Screw	4	
6	XTN3+8G	Access Cover Screw	4	
7	XYC3+CJ10	Screw with Washer	1	

12.8 Keyboard



Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
1	PAKM20Z	Keyboard Top Cover	1	
2	PABD1Z	Selector Knob	4	
3	PAWP2009ZA	Keyboard 2>Select) PCB Complete	1	
4	PAWP2008ZA	Keyboard 1(Function) PCB Complete	1	
5	PASH1Z	Keyboard	1	
6	PAWN1Z	Curl Cord Complete	1	
7	PAKM21Z	Keyboard Base	1	
8	PAKE6Z	Keyboard Release Hook (L)	1	
9	PAKE7Z	Keyboard Release Hook (R)	1	
10	PAKL5082Z	Keyboard Adjuster	2	
11	PAKE9Z	Keyboard Spring	2	
12	PAHG327Z	Rubber Plate	3	
13	PABC28ZA-2	Function Key-2(Blue)	3	
14	PABC28ZA-3	Function Key-3(Green)	1	
15	PABC28ZA-1	Function Key-1(Gray)	2	
16	XTN3+10GK	Keyboard Base Screw	5	
17	XTN3+8G	Keyboard Screw	4	
18	XTN3+8G	Keyboard 1(Function) Screw	3	
19	XTS3+8B	Keyboard 2>Select) Screw	2	
20	BABZ72Z	Key Top, L MAR	1	
21	PABZ73Z	Key Top, MAR REL	1	
22	PABZ3Z	Key Top, 1!	1	
23	PABZ4Z	Key Top, 2@	1	
24	PABZ5Z	Key Top, 3#	1	
25	PABZ6Z	Key Top, 4\$	1	
26	PABZ7Z	Key Top, 5%	1	
27	PABZ8Z	Key Top, 6¢	1	
28	PABZ9Z	Key Top, 7&	1	
29	PABZ10Z	Key Top, 8*	1	
30	PABZ11Z	Key Top, 9(1	
31	PABZ12Z	Key Top, 0)	1	
32	PABZ13Z	Key Top, --	1	
33	PABZ14Z	Key Top, =+`	1	
34	PABZ15Z	Key Top, BACK SPACE	1	
35	PABZ16Z	Key Top, FWD	1	
36	PABZ17Z	Key Top, NEXT PAGE PREVIOUS	1	
37	PABZ18Z	Key Top, PRINT	1	
38	PABZ19Z	Key Top, R MAR	1	
39	PABZ20Z	Key Top, TAB DTAB	1	
40	PABZ21Z	Key Top, Q	1	
41	PABZ22Z	Key Top, W	1	
42	PABZ23Z	Key Top, E EMBED	1	
43	PABZ24Z	Key Top, R RMF	1	
44	PABZ25Z	Key Top, T	1	
45	PABZ26Z	Key Top, Y	1	
46	PABZ27Z	Key Top, U XX	1	
47	PABZ28Z	Key Top, I P INDENT	1	
48	PABZ29Z	Key Top, O	1	
49	PABZ30Z	Key Top, P STOP	1	
50	PABZ31Z	Key Top, ½¼½	1	
51	PABZ32Z	Key Top, EE	1	
52	PABZ33Z	Key Top, ☒	1	
53	PABZ34Z	Key Top, ↑	1	
54	PABZ35Z	Key Top, TAB SET	1	
55	PABZ36Z	Key Top, LOCK	1	
56	PABZ37Z	Key Top, A AUTO	1	

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
57	PABZ38Z	Key Top, S SEARCH	1	
58	PABZ39Z	Key Top, D	1	
59	PABZ40Z	Key Top, F FIND	1	
60	PABZ41Z	Key Top, G	1	
61	PABZ42Z	Key Top, H HALF SP	1	
62	PABZ43Z	Key Top, J	1	
63	PABZ44Z	Key Top, K	1	
64	PABZ45Z	Key Top, L CHG FORM	1	
65	PABZ46Z	Key Top, ; :	1	
66	PABZ47Z	Key Top, "	1	
67	PABZ48Z	Key Top, RETURN	1	
68	PABZ49Z	Key Top, ⇡	1	
69	PABZ50Z	Key Top, ⇢	1	
70	PABZ51Z	Key Top, TAB CLR	1	
71	PABZ52Z	Key Top, SHIFT	1	
72	PABZ53Z	Key Top, Z	1	
73	PABZ54Z	Key Top, X	1	
74	PABZ55Z	Key Top, C CENTER	1	
75	PABZ56Z	Key Top, V	1	
76	PABZ57Z	Key Top, B BOLD	1	
77	PABZ58Z	Key Top, N	1	
78	PABZ59Z	Key Top, M QUANTITY	1	
79	PABZ60Z	Key Top, „i	1	
80	PABZ61Z	Key Top, „ç	1	
81	PABZ62Z	Key Top, / ? ~	1	
82	PABZ63Z	Key Top, SHIFT	1	
83	PABZ64Z	Key Top, ⇩	1	
84	PABZ65Z	Key Top, ⇩	1	
85	PABZ66Z	Key Top, CODE	1	
86	PABZ67Z	Key Top, RPT	1	
87	PABZ68Z	Key Top, SPACE	1	
88	PABZ69Z	Key Top, RELOC EXP	1	
89	PABZ70Z	Key Top, QUICK ERASE	1	
90	PABZ71Z	Key Top, ⇩	1	
91	PADS2Z	Key Spring	72	
92	PADS1Z	Key Spring	71	
93	PACC1Z	Key Top Support (L)	1	
94	PACC2Z	Key Top Support (M)	1	
95	PACC3Z	Key Top Support (S)	3	
96	PAZC1Z	Key Top Base	1	
97	PAUP2Z	Keyboard FPC	1	
98	PAMD29Z	Keyboard Frame	1	
99	PAXAJE03W150	Flat Cord	1	

12.9 Main Logic Board(PAWP2006ZA)

Ref. No.	Parts No.	Parts Name and Description			Per Set	Remarks
Integrated Circuit, Transistors and Diodes						
IC1	PJVIM89321B	IC			1	
IC2	PJVIM53238P	IC			1	
IC3	PJVIM70H036	IC			1	
IC4	PAVI74LS157	IC			1	
IC5	PAVI74LS157	IC			1	
IC6	PAVI74LS157	IC			1	
IC7	PJVIL3517L10	IC			1	
IC8	PJVIL3517L10	IC			1	
IC9	PAWI2W1500M	IC ROM			1	
IC10	PAVIB8464ALL	IC			1	
IC11	PAWI3W1500M	IC ROM			1	
IC12	PAWI1W1500M	IC ROM			1	
IC13	PAVI74LS157	IC			1	
IC14	PAVI74LS157	IC			1	
IC15	MN41464A-08	IC			1	
IC16	MN41464A-08	IC			1	
IC17	MN1280S	IC			1	
IC18	PJVIHD63B03X	IC			1	
IC19	PEVIM612106	IC			1	
IC20	PJVITA7288P	IC			1	
IC21	PJVITD62003A	IC			1	
IC22	PJVITD62064A	IC			1	
IC23	PAVID72067C	IC			1	
IC24	PJVIM74LS14	IC			1	
IC25	PJVIM74LS38	IC			1	
IC26	PJVIM74LS00	IC			1	
Q1	2SD1826	Transistor			1	
Q2	2SB909MQ	Transistor			1	
Q3	2SB909MQ	Transistor			1	
D1	MA1120	Diode			1	
D2	MA165	Diode			1	
D3	MA165	Diode			1	
D4	MA165	Diode			1	
D5	RVD1N4003A	Diode			1	
D6	PJVDHZ12A2	Diode			1	
D7	PJVDHZ12A2	Diode			1	
D8	MA1300	Diode			1	
D9	MA1360	Diode			1	
D10	RVD1N4003A	Diode			1	
D12	1SS106	Diode			1	
Resistors						
R2	ERDS2TJ103	10K	1/4W	Carbon	1	
R3	ERDS2TJ681	680	1/4W	Carbon	1	
R4	ERDS2TJ681	680	1/4W	Carbon	1	
R5	ERDS2TJ151	150	1/4W	Carbon	1	
R6	ERDS2TJ681	680	1/4W	Carbon	1	
R7	ERDS2TJ101	100	1/4W	Carbon	1	
R8	ERDS2TJ101	100	1/4W	Carbon	1	
R9	ERDS2TJ101	100	1/4W	Carbon	1	
R10	ERDS2TJ101	100	1/4W	Carbon	1	
R11	ERDS2TJ105	1M	1/4W	Carbon	1	
R12	ERDS2TJ101	100	1/4W	Carbon	1	
R13	ERDS2TJ122	1.2K	1/4W	Carbon	1	
R14	ERDS2TJ221	220	1/4W	Carbon	1	
R15	ERDS2TJ223	22K	1/4W	Carbon	1	
R16	ERDS2TJ101	100	1/4W	Carbon	1	
R17	ERDS2TJ103	10K	1/4W	Carbon	1	

Ref. No.	Parts No.	Parts Name and Description			Per Set	Remarks
R18	ERDS2TJ333	33K	1/4W	Carbon	1	
R19	ERDS2TJ105	1M	1/4W	Carbon	1	
R20	ERDS2TJ103	10K	1/4W	Carbon	1	
R21	ERDS2TJ102	1K	1/4W	Carbon	1	
R22	ERDS2TJ103	10K	1/4W	Carbon	1	
R23	ERDS2TJ221	220	1/4W	Carbon	1	
R25	ERDS2TJ101	100	1/4W	Carbon	1	
R26	ERDS2TJ101	100	1/4W	Carbon	1	
R27	ERDS2TJ472	4.7K	1/4W	Carbon	1	
R28	ERDS2TJ472	4.7K	1/4W	Carbon	1	
R29	ERDS2TJ223	22K	1/4W	Carbon	1	
R30	ERDS2TJ681	680	1/4W	Carbon	1	
R31	ERDS2TJ561	560	1/4W	Carbon	1	
R32	ERDS2TJ223	22K	1/4W	Carbon	1	
R33	ERDS2TJ561	560	1/4W	Carbon	1	
R34	ERDS2TJ223	22K	1/4W	Carbon	1	
R35	ERG2ANJ121H	120	2W	Metal	1	
R36	ERG2ANJ330H	33	2W	Metal	1	
R37	ERG2ANJ330H	33	2W	Metal	1	
R38	ERG2ANJ330H	33	2W	Metal	1	
R39	ERDS2TJ472	4.7K	1/4W	Carbon	1	
RA1	EXBP88103J	Resistor Array (10K X 8)			1	
RA2	EXBP88103J	Resistor Array (10K X 8)			1	
RA3	EXBP88103J	Resistor Array (10K X 8)			1	
RA4	EXBP85332J	Resistor Array (3.3K X 5)			1	

Capacitors

C2	ECFF1E104ZF	0.1	25V	Ceramic	1	
C3	ECCF1H470J	47P	50V	Ceramic	1	
C4	ECCF1H330JC	33P	50V	Ceramic	1	
C5	ECCF1H330JC	33P	50V	Ceramic	1	
C6	ECFF1E104ZF	0.1	25V	Ceramic	1	
C7	ECFF1E104ZF	0.1	25V	Ceramic	1	
C8	ECFF1E104ZF	0.1	25V	Ceramic	1	
C9	ECFF1E104ZF	0.1	25V	Ceramic	1	
C10	ECFF1E104ZF	0.1	25V	Ceramic	1	
C11	ECFF1E104ZF	0.1	25V	Ceramic	1	
C12	ECFF1E104ZF	0.1	25V	Ceramic	1	
C13	ECFF1E104ZF	0.1	25V	Ceramic	1	
C14	ECFF1E104ZF	0.1	25V	Ceramic	1	
C15	ECFF1E104ZF	0.1	25V	Ceramic	1	
C16	ECEA1CU100	10	16V	Electrolytic	1	
C17	ECFF1E104ZF	0.1	25V	Ceramic	1	
C18	ECKF1H102KB	1000P	50V	Ceramic	1	
C19	ECCF1H270JC	27P	50V	Ceramic	1	
C20	ECCF1H270JC	27P	50V	Ceramic	1	
C21	ECFF1E104ZF	0.1	25V	Ceramic	1	
C22	ECCF1H220JC	22P	50V	Ceramic	1	
C23	ECCF1H220JC	22P	50V	Ceramic	1	
C24	ECEA0JU101	100	6.3V	Electrolytic	1	
C25	ECFF1E104ZF	0.1	25V	Ceramic	1	
C28	ECEA1CU100	10	16V	Electrolytic	1	
C31	ECKF1H101KB	100P	50V	Ceramic	1	
C32	ECKF1H101KB	100P	50V	Ceramic	1	
C33	ECKF1H101KB	100P	50V	Ceramic	1	
C34	ECKF1H101KB	100P	50V	Ceramic	1	

Ref. No.	Parts No.	Parts Name and Description			Per Set	Remarks
C35	ECKF1H101KB	100P	50V	Ceramic	1	
C36	ECKF1H101KB	100P	50V	Ceramic	1	
C37	ECKF1H101KB	100P	50V	Ceramic	1	
C38	ECKF1H101KB	100P	50V	Ceramic	1	
C39	ECCF1H470J	47P	50V	Ceramic	1	
C40	ECKF1H101KB	100P	50V	Ceramic	1	
CA1	EXFP7101MW	Capacitor Array (100P X 7)			1	

Other Parts

B1	PAWP2006ZA	Main logic PCB Complete	1	
BA1	PEJSDICF32CE	32p IC Socket	1	
	PASCPKM22EPP	Buzzer	1	
L1	BR-2032-1HF	Lithium Battery	1	
L2	TSK1008	Beaded Core	1	
L3	TAK1008	Beaded Core	1	
X1	PAYCCSA22MX	Beaded Core	1	
X2	EF0A7R0M03A2	X'tal	1	
X3	PAVCHC49U32	X'tal	1	
CN1	VJP1143	X'tal	1	
CN2	PAJP526704A	5P Connector	1	
CN3	PAJPM6008114	4P Connector	1	
CN4	PAJS12SS1T1	8P Connector	1	
CN5	PJJP40Z	12P Connector	1	
CN6	PAJP7626602T	6P Connector	1	
CN7	VJP1144	26P Connector	1	
CN8	VJP1141	6P Connector	1	
		2P Connector	1	S

12.10 Keyboard Board

① Keyboard 1 (Function) (PAWP2008ZA)

Ref. No.	Parts No.	Parts Name and Description				Per Set	Remarks
Integrated Circuit, Transistors and Diodes							
IC101	MN51003QPD	IC				1	
Resistors							
R101	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R102	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R103	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R104	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R105	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R106	ERDS2TJ472	4.7K	1/4W	Carbon		1	
R107	ERDS2TJ472	4.7K	1/4W	Carbon		1	
RA101	EXBP88472K	Resistor Array (4.7k x 8)				1	
Capacitors							
C101	ECKF1H101KB	100P	50V	Ceramic		1	
C102	ECEAOJU101	100	6.3V	Electrolytic		1	
C103	ECFF1E104ZF	0.1	50V	Ceramic		1	
C104	ECKF1H101KB	100P	50V	Ceramic		1	
C105	ECKF1H331KB	330P	50V	Ceramic		1	
C106	ECKF1H101KB	100P	50V	Ceramic		1	
C107	ECKF1H101KB	100P	50V	Ceramic		1	
C108	ECKF1H101KB	100P	50V	Ceramic		1	
Other Parts							
CN101	PAWP2008ZA	Keyboard 1 (Function) PCB Assembly				1	
CN102	PAJSHBLB9S5J	Connector				1	
CN103	PAJSHBLB9S5J	Connector				1	
CN104	PAJPB8BXHA	Connector				1	
CN105	PAXAJE03W150	Flat Cord				1	
SW101	EVQ-QTL05R	Function Switch				1	
SW102	EVQ-QTL05R	Function Switch				1	
SW103	EVQ-QTL05R	Function Switch				1	
SW104	EVQ-QTL05R	Function Switch				1	
SW105	EVQ-QTL05R	Function Switch				1	
SW106	EVQ-QTL05R	Function Switch				1	

② Keyboard 2 (Select) PCB (PAWP2009ZA)

Ref. No.	Parts No.	Parts Name and Description				Per Set	Remarks
Integrated Circuit, Transistors and Diodes							
D101	1SS106	Diode				1	
D102	1SS106	Diode				1	
D103	1SS106	Diode				1	
D104	1SS106	Diode				1	
Other Parts							
CN105	PAWP2009ZA	Keyboard 2 (Select) PCB Assembly				1	
SW107	TJSIA8560A	Connector				1	
SW108	PAEST1001010	K.B Selector Switch				1	
SW109	PAEST1101010	Line Space Selector Switch				1	
SW110	PAEST1101010	Pitch Selector Switch				1	
	PAEST1101010	Type Mode Selector Switch				1	

12.11 Power Supply (PAWP2007ZA)

Ref. No.	Parts No.	Parts Name and Description			Per Set	Remarks
Integrated Circuit, Transistors and Diodes						
IC201	NJM2901N	IC		1		
IC202	ON3161-Q	IC		1		
IC203	ON3161-Q	IC		1		△
IC251	AN7805	IC		1		
IC252	AN78N12	IC		1		
Q201	2SK806	Transistor (FET)		1		
Q202	2SC3311	Transistor		1		S
Q203	2SA1309	Transistor		1		S
Q251	2SD1826	Transistor		1		
Q252	2SD637	Transistor		1		S
Q253	2SD637	Transistor		1		△ S
D201	PAVD2SBA60F1	Diode		1		
D202	TVSRGP10J	Diode		1		
D203	MA185	Diode		1		
D204	MA4120-H	Diode		1		
D205	RD2.2ESB1	Diode		1		
D206	03P2M	Thyrister		1		S
D251	PAVDD4LA20	Diode		1		
D252	PAVDERB932L3	Diode		1		
D253	PAVD11DF2FFC	Diode		1		
D254	PAVDERB932L3	Diode		1		
D255	MA4220-M	Diode		1		
D256	MA4330-L	Diode		1		△
D257	MA165	Diode		1		△
D258	MA27Q-A	Diode		1		△
D259	MA27Q-A	Diode		1		△
D260	MA165	Diode		1		△
D261	MA165	Diode		1		△
D262	MA1270-L	Diode		1		
D263	MA4200-M	Diode		1		
D264	MA4062-L	Diode		1		
Resistors						
R201	ERF5ZXK3R9	3.9	5W	Winding	1	
R202	ERG3ANJ683	68K	3W	Metal	1	
R203	ERDS2TJ102	1K	1/4W	Carbon	1	
R204	ERDS2TJ473	47K	1/4W	Carbon	1	
R205	ERDS2TJ151	150	1/4W	Carbon	1	
R206	ERDS2TJ272	2.7K	1/4W	Carbon	1	
R207	ERDS2TJ271	270	1/4W	Carbon	1	
R208	ERG2ANJ103	10K	2W	Metal	1	
R209	ERG2ANJ103	10K	2W	Metal	1	
R210	ERDS2TJ222	2.2K	1/4W	Carbon	1	
R211	ERDS1TJ824	820K	1/2W	Carbon	1	
R212	ERDS1TJ824	820K	1/2W	Carbon	1	
R213	ERDS2TJ183	18K	1/4W	Carbon	1	
R214	ERDS2TJ222	2.2K	1/4W	Carbon	1	
R215	ERDS2TJ153	15K	1/4W	Carbon	1	
R216	ERDS2TJ222	2.2K	1/4W	Carbon	1	
R217	ERDS2TJ153	15K	1/4W	Carbon	1	
R218	ERDS2TJ273	27K	1/4W	Carbon	1	
R219	ERDS2TJ104	100K	1/4W	Carbon	1	
R220	ERDS2TJ223	22K	1/4W	Carbon	1	
R221	ERDS2TJ823	82K	1/4W	Carbon	1	
R222	ERDS2TJ393	39K	1/4W	Carbon	1	

Ref. No.	Parts No.	Parts Name and Description				Per Set	Remarks
R223	ERDS2TJ1R5	1.5	1/4W	Carbon		1	
R224	ERDS2TJ103	10K	1/4W	Carbon		1	
R251	ERDS1TJ332	3.3K	1/2W	Carbon		1	
R252	ERDS2TJ562	5.6K	1/4W	Carbon		1	
R253	EROS2CKF1372	13.7K	1/4W	Carbon		1	
R254	EROS2CKF2202	22.0K	1/4W	Carbon		1	
R255	ERDS2TJ392	3.9K	1/4W	Carbon		1	
R256	EVND4AA00B14	10K	B	Control		1	
R257	ERDS2TJ473	47K	1/4W	Carbon		1	
R258	ERDS2TJ183	18K	1/4W	Carbon		1	
R259	ERDS2TJ102	1K	1/4W	Carbon		1	
R260	ERDS2TJ102	1K	1/4W	Carbon		1	
Capacitors							
C201	ECKDNS222ME	2200P	125VAC	Ceramic		1	
C202	ECKDNS222ME	2200P	125VAC	Ceramic		1	
C203	ECQU1A473MHB	0.047	125VAC	M. Plastic		1	
C204	ECQU1A473MHB	0.047	125VAC	M. Plastic		1	
C205	ECES2DU331K	330	200V	Electrolytic		1	
C206	ECEA2VS3R3	3.3	350V	Electrolytic		1	
C207	ECKF1H103ZF	0.01	50V	Ceramic		1	
C208	ECEA1CU101	100	16V	Electrolytic		1	
C209	ECEA1CU470	47	16V	Electrolytic		1	
C210	ECKF1H682KB	6800P	50V	Ceramic		1	
C211	ECCF1H151JC	150P	50V	Ceramic		1	
C212	ECFF1E104ZF	0.1	25V	Ceramic		1	
C213	ECKDNS222ME	2200P	125VAC	Ceramic		1	
C214	EXNG102Z365	C-R Combination				1	
C251	ECKF2H221KB	220P	500V	Ceramic		1	
C252	ECKF1H101KB	100P	50V	Ceramic		1	
C254	ECEA1EGE102	1000	25V	Electrolytic		1	
C255	ECEA1CGE471	470	16V	Electrolytic		1	
C256	ECEA1EGE471	470	25V	Electrolytic		1	
C257	ECEA1VU471	470	35V	Electrolytic		1	
C258	ECEA1CU102	1000	16V	Electrolytic		1	
C259	ECEA1CU100	10	16V	Electrolytic		1	
C260	ECFF1E104ZF	0.1	25V	Ceramic		1	
C261	ECFF1E104ZF	0.1	25V	Ceramic		1	
C262	ECFF1E104ZF	0.1	25V	Ceramic		1	
C263	ECEA0JU221	220	6.3V	Electrolytic		1	
Other Parts							
F201 L201 L202 T201	PAWP2007ZA	Power PCB Complete				1	
	XBA1C20NU100	2A 125V Fuse				1	
	ELF18D415	Line filter				1	
	TLP408	Beaded Core				2	
	ETS35K303A	Switching Transformer				1	
	PAMY4082ZA	Heat Sink (Q201)				1	
	PAMY2082ZB	Heat Sink				1	
	XYN3+F10	Screw (IC, Tr to Heat Sink)				5	
	XTV3+8F	Screw (Heat Sink to Power PCB)				2	
	PAXAJE01W150	1P GND Lead (K)				1	
F252 L251	PAXAJT02W150	Power-Video Lead				1	
	PAXAJT06W150	Power-CPU Lead				1	
	PAXBSSFR1F6	1A 125V Fuse				1	
	TSC909	Beaded Core				1	
	PAXAJE01K101	1P GND Lead				1	

12.12 CRT Display Circuit Board

① Video-A PCB (PANP30912AB)

Ref. No.	Parts No.	Parts Name and Description			Per Set	Remarks
Integrated Circuit, Transistors and Diodes						
IC501	TVSuPC1379C	IC			1	
Q502	2SC1473-R	Transistor			1	
D404	TVSRGP10JG3	Diode			1	
D405	MA1100-H	Diode			1	
D504	TVS10DF4	Diode			1	
D508	TVSDINK20	Diode			1	
D512	TVSRU1CLFB1	Diode			1	S
Resistors						
R405	EVN61AA00B14	10K	B	Control	1	
R406	ERDS2TJ822	8.2K	1/4W	Carbon	1	
R407	ERD25FJ120P	12	1/4W	Carbon	1	
R408	ERDS2TJ103	10K	1/4W	Carbon	1	
R409	ERDS2TJ333	33K	1/4W	Carbon	1	
R410	EVN61AA00B52	500	B	Control	1	
R411	ERDS2TJ332	3.3K	1/4W	Carbon	1	
R412	ERDS2TJ272	2.7K	1/4W	Carbon	1	
R413	EVN61AA00B53	5K	B	Control	1	
R414	ERDS2TJ1R2	1.2	1/4W	Carbon	1	
R415	ERDS2TJ1R0	1	1/4W	Carbon	1	
R417	ERD25FJ221P	220	1/4W	Carbon	1	
R419	ERDS2TJ222	2.2K	1/4W	Carbon	1	
R421	ERDS2TJ391	390	1/4W	Carbon	1	
R422	ERDS2TJ103	10K	1/4W	Carbon	1	
R506	ERDS1TJ391	390	1/2W	Carbon	1	
R507	ERDS2TJ562	5.6K	1/4W	Carbon	1	
R508	ERDS2TJ102	1K	1/4W	Carbon	1	
R509	ERDS2TJ153	15K	1/4W	Carbon	1	
R510	EVN61AA00B25	200K	B	Control	1	
R511	ERDS2TJ332	3.3K	1/4W	Carbon	1	
R512	EVN61AA00B14	10K	B	Control	1	
R514	ERG2ANJ220H	22	2W	Metal	1	
R515	ERG1SJU272V	2.7K	1W	Metal	1	
R520	ERD2FCG122P	1.2K	1/4W	Fuse	1	
R521	ERQ12HJ272P	2.7K	1/2W	F.Metal	1	
R522	ERDS2TJ563	56K	1/4W	Carbon	1	
R527	ERDS2TJ563	56K	1/4W	Carbon	1	
R528	EVN61AA00B25	200K	B	Control	1	
R531	EVME6U10KB26	2M	B	Control	1	
R537	ERG1SJU223V	22K	1W	Metal	1	
R545	ERDS2TJ271	270	1/4W	Carbon	1	
Capacitors						
C404	ECEA1HU2R2B	2.2	50V	Electrolytic	1	
C405	ECQV1H105JZ	1	50V	TF	1	
C406	ECEA1CU222	2200	16V	Electrolytic	1	
C407	ECEA1CU470	47	16V	Electrolytic	1	
C408	ECEA1HU4R7	4.7	50V	Electrolytic	1	
C409	ECEA1CU102	1000	16V	Electrolytic	1	
C410	ECEA1CU101	100	16V	Electrolytic	1	
C411	ECQM1H104KV	0.1	50V	Polyester	1	
C412	ECKF1H103ZF	0.01	50V	Ceramic	1	
C504	ECEA1HU010	1	50V	Electrolytic	1	
C505	ECQP1472JZ	0.0047	100V	Polypropylene	1	
C506	ECEA1CU470	47	16V	Electrolytic	1	

Ref. No.	Parts No.	Parts Name and Description				Per Set	Remarks
C508	ECKD2H102KB	1000P	500V	Ceramic		1	
C509	ECQF6472JZ	0.0047	630V	Polypropylene		1	
C510	ECQF6392JZ	0.0039	630V	Polypropylene		1	▲
C511	ECQE1185KN	1.8	100V	Polyester		1	
C517	ECQF6392JZ	0.0039	630V	Polypropylene		1	▲
C518	ECEA2AU101	100	100V	Electrolytic		1	
C520	ECQE10473MV	0.047	1KV	Polyester		1	
C529	ECQM1H104KV	0.1	50V	Polyester		1	
C530	ECQM1H103KV	0.01	50V	Polyester		1	
C531	ECQM1H153KV	0.015	50V	Polyester		1	
C532	ECEA1HU2R2	2.2	50V	Electrolytic		1	
C534	ECKD2H222KB	2200P	500V	Ceramic		1	
C801	ECEA1CU471	470	16V	Electrolytic		1	
C802	ECEA1VU471	470	35V	Electrolytic		1	
Other Parts							
L501	PANP30912AB VJP1143 VJP1188 VJP1142 ELH16F765	Video-A PCB Complete 5P Connector (Co-1A) 4P Connector (Co-2A) 3P Connector (Co-3A) Horizontal Width Coil				1	
L502	PALH30601E	Linearity Coil				1	▲
L503	EXCELDR35C	Beaded Core				1	
T501	PALF30902D-1	FBT				1	
T502	ETH14Y25AY PAXAJE01K101	Horizontal Drive Transformer 1P GND Lead (A10)				1	▲

② Video-C PCB (PANP31411AB)

Ref. No.	Parts No.	Parts Name and Description				Per Set	Remarks
Integrated Circuit, Transistors and Diodes							
Q351	2SC2705	Transistor				1	
D351	MA165	Diode				1	
Resistors							
R361	ERC14GJ103	10K	1/4W	Solid		1	
R362	ERG2ANJ272H	2.7K	2W	Metal		1	
R363	ERC12GK681	680	1/2W	Solid		1	
R364	ERD25FJ5R6P	5.6	1/4W	Carbon		1	
R365	ERC14GJ103	10K	1/4W	Solid		1	
R366	ERC14GJ683	68K	1/4W	Solid		1	
R370	ERDS2TJ101	100	1/4W	Carbon		1	
R372	ERDS2TJ471	470	1/4W	Carbon		1	
Capacitors							
C351	ECCF1H620JC	62P	50V	Ceramic		1	
C353	ECKD3A562KBN	5600P	1KV	Ceramic		1	
C354	ECEA2AU470	47	100V	Electrolytic		1	
C355	ECKD2H102KB	1000P	500V	Ceramic		1	S
Other Parts							
L351	PANP31411AB TLT101K991R TLT220K991R XANT137 TJS25640V VJP1142	Video-C PCB Complete 100uH 22uH Neon Lamp CRT Socket 3P Connector(Co-1C)				1	
S351						1	S

③ Video-X PCB (PANP31723 ZA)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
Integrated Circuit, Transistors and Diodes				
Q501	2SC3170	Transistor	1	
Other Parts				
	PANP31723ZA	Video-X PCB Complete	1	

11.13 Brightness Board(PAWP2010ZA)

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
Other Parts				
VR	PAWP2010ZA EWAMFEC10B15 PAXAJT03W150	Brightness Control PCB Complete 100K B Slide Volume Brightness-Video Lead	1 1 1	

11.14 Others

Ref. No.	Parts No.	Parts Name and Description	Per Set	Remarks
Packing Materials				
	PAPG20Z PAPE8Z PAPE9Z PAPE10Z PAPE11Z PJET7001Z PJIT9002Z PJI9026Z PJEJ27Z PJEJ28Z PAQX1Z PAJN41DD1Z PAPP6Z	Carton Box Pad (Upper Right) Pad (Upper Left) Pad (Bottom Right) Pad (Bottom Left) Daisy Wheel Lift-Off Tape Correctable Ribbon Daisy Cassette Cover Daisy Cassette Case Instruction Book Floppy Disk Dust Cover	1 1 1 1 1 1 1 1 1 1 1 1 1 1	